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Surgery, Gynecology and Obstetrics

WITH

International Abstract of Surgery

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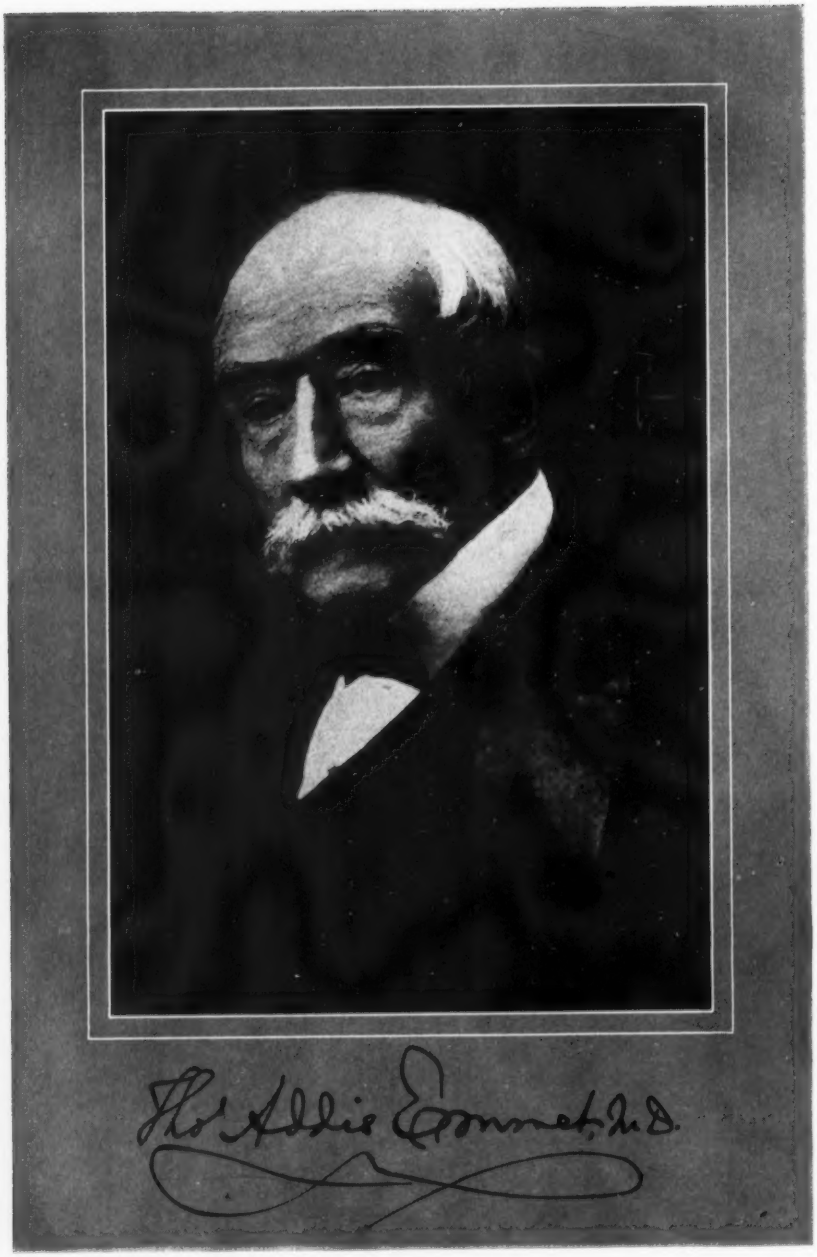
Thos Addis Emmet, M.D.

SURGERY, GYNECOLOGY AND OBSTETRICS

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IN MEMORIAM*

THOMAS ADDIS EMMET, M.D., LL. D.

1828–1919

BY J. RIDDLE GOFFE, M.D., F.A.C.S., NEW YORK

"Ave atque Vale! bold scion of a noble name
"And of a stock more royal than of kings!
"Calm scholar, sage, brave exemplar of things
"So splendid that they mock the smile of Fame!"[1]

WITH each succeeding year, one by by one the great men, fathers of our specialty, are passing away. Today we are called upon to record with expressions of supreme respect, admiration, and love, the departure of our oldest living member and Founder, Dr. Thomas Addis Emmet.

To the younger generation of rising gynecologists Dr. Emmet may be nothing more than a name, but to those who were associated with him in his plastic work and came under the charm of his clinical lectures, the name, Emmet, will be an inspiration as long as working days shall last. By force of his own genius, indomitable will, and untiring energy, he invaded an unexplored field of surgical work, elaborated his own system of pathology, devised original plastic procedures, invented instruments to meet new requirements and, with the exception of laparotomy, covered the whole range of gynecological surgery. He embodied this work in a volume entitled *The Principles and Practice of Gynecology*, which appeared in 1879 and ran through three editions in fifteen months. All three editions were reproduced in London and later the book was translated into the French and German languages. Dr. Emmet described only his own work and the book was original from cover to cover.

Dr. Emmet played a great part in the surgery of the nineteenth century; a pioneer in an unexplored field of surgery, he had new problems to solve and difficulties to overcome; but he had also results to achieve and he achieved them. The story of his life is a story full of fascination and inspiration.

Dr. Emmet came of a long line of eminent men who were conspicuous in Irish history. He tells us that his grandfather, Thomas Addis Emmet, for whom he was undoubtedly named, was a prominent physician in Dublin, Ireland. His father, John Patton Emmet, was born in Ireland but emigrated to this country at an early age. His mother, Mary Boyd Tucker, was a native of Bermuda. Her family came from the county of Kent, England. Thomas Addis was born May 29, 1828, at the University of Virginia, Charlottesville, Virginia, where his father was one of the original professors appointed by Thomas

[1] Lines from an ode addressed to Dr. Emmet by J. C. Lawson.

* Presented before the American Gynecological Society, Atlantic City, June, 1919.

Jefferson to fill the chair of natural history; later assigned to chemistry and materia medica. His father, in a letter, describes Thomas Addis when born as a small, delicate child but that he speedily became large, plump and heavy, and predicted that he would become eminent in music, wit, and poetry. As a boy, however, he had no taste for books, music or poetry, played truant constantly, and spent much time roaming about the woods and hills with his gun—in the course of which, if opportunity offered, he would jump on the back of a razor-back hog, and holding on to both its ears take a John-Gilpin-like ride. He was fond of reading, however, and spent many hours with books of travel, history, scientific treatises and novels, seeking and listening to explanations by his father, who was ever ready to respond fully to his questions.

Through frequent visits to his uncle who lived on Second Avenue, New York (then a fashionable district), he became familiar with the city and its surroundings and finally was sent to a famous private school at Flushing, Long Island. After his father's death he entered the counting-house of one of his uncles in New York, but the life and work were not to his taste, and after a brief experience he entered the University of Virginia. It soon developed that he had as little taste and inclination for the college class-room as for the counting-house. In great despair but in a moment of inspiration he thought of Dr. Dunglison of the Jefferson Medical College, Philadelphia, who had been a colleague of his father at the University of Virginia and a warm personal friend. He wrote to him asking his opinion as to the desirability of his trying to study medicine. His suggestion met with cordial approval. He hastened to Philadelphia and attended his first lecture, delivered at Jefferson Medical College by J. K. Mitchell, Professor of Theory and Practice of Medicine, October, 1846. "From that hour," Dr. Emmet writes, "I felt my life's work was laid out for me." He had come from a family of physicians and had at last caught on to the family groove. He now got down to work and life assumed a more serious aspect. Dr. S. Weir Mitchell was a fellow student. Dr. Emmet received his medical diploma in 1848 and was commended for his thesis, "On the Original Circle of Nutrition." "Yet," he says, "I had dissected but a single muscle in the human body and graduated without having written a prescription or attended an obstetric case."[1] He returned to New York and received the appointment of resident physician to the Emigrant Refuge Hospital on Ward's Island which was just completed and about to be opened for patients. He served in this capacity for three years, having had in that time under his charge over 11,000 miscellaneous cases, including eruptive fevers, ship fever, obstetrics, and surgery. Upon the expiration of his service, he was appointed visiting physician to the hospital and secretary of the board at a salary of four dollars a day, on which, together with a small increase from general practice, he soon married.

In the spring of 1855 through a turn in politics he lost his position on Ward's Island. By mere accident he made the acquaintance at this time of J. Marion Sims. This incident proved the turning point in his career. Dr. Sims was a restless genius, intolerant of restraint, a skillful operator, quick to comprehend every new condition or complication and ready to meet it, insistent upon every detail, but never did two operations exactly in the same way. The orderly regimen of a hospital irritated him and case histories and records were his *bête noire*. He promptly recognized in Emmet the qualities of methodical work that had been developed during his service at the Emigrant Hospital in keeping the admission cards and case histories according to prescribed systems, and he selected him at once to become his assistant and associate in the Woman's Hospital.

"During our joint service of five and a half years at the Woman's Hospital my relation with Dr. Sims was as close as that of a son. If he had not given us certain instruments which opened the way for investigation, with his knowledge of suture wire and his perfect technique, I should never have been known to the world in connection with gynecology."

Dr. Emmet was appointed assistant to the Woman's Hospital in 1855 and served in that

[1] This was not stated in criticism, but to reflect the low standard in vogue at that time.

capacity, carrying the whole burden and responsibility of the surgical work with the assistance of a resident surgeon and house staff for a period of ten years, to 1872. He personally kept most careful and accurate history of every case and illustrated the pathologic conditions and the operations with pen and ink drawings, sometimes coloring them with tobacco juice and other pigments. These history books are still to be seen in the library of the hospital.

This was the period of his great and most productive work. Dr. Sims, in his vesicovaginal fistula achievement, had attempted operation only on those cases in which the borders of the fistula could be readily approximated. Those in which the contractile scar tissue held the edges of the fistula widely apart were classed as inoperable and dismissed. Dr. Emmet took up the study of these cases and by patient, persistent effort devised ways and means of incising the adhesive bands and softening the scar tissue so that the edges of the open fistula could be finally approximated and closed. This was a great triumph. Gradually the formerly discarded cases were sent for, submitted to the treatment, and finally cured.

In 1868 he published his first medical work entitled, "Vesicovaginal Fistula," containing the report of 600 cases. The difficulties encountered in denuding the edges of distorted and inaccessible fistulæ suggested scissors as a substitute for the knife. His mechanical ingenuity devised scissors with blades set at various angles to the shafts or curved in various arcs of circles. These facilitated the work and made possible his incomparable success. Dr. Emmet asserts that the substitution of these scissors for the knife was his first contribution to surgery. The general surgeon of today recognizes the advantage of this device by carrying in his kit the successors of these famous scissors.

The extraordinary concentration of clinical material in the Woman's Hospital afforded rare opportunity for the study of manifold lesions. It was natural that fistula cases should present many and varied phases of lacerated cervix, waterlogged and infected. These he studied with infinite patience and assiduity till, as a corollary to the fistula, he found that by puncturing the diseased glands, blood-letting, hot water douches and antiseptic stimulating applications, he could reduce them all to the primary condition of simple or double laceration. Denudation of opposing surfaces and stitching them together with silver wire effected a cure. Thus he invented the operation of trachelorrhaphy which has played so great a part in the evolution of gynecology as a surgical specialty.

Thus also he reached the conclusion that the condition which had been universally accepted from the teachings of Dr. Bennett, of London, as an *ulceration* had its origin in a *laceration* of the cervix. Out of this discovery he developed to a nicety of perfection his plastic operation of restoration of the cervix uteri, known as trachelorrhaphy. This was a great discovery. It disclosed the fact that the origin of the condition was inherent in the laceration, which exposed the tissues to an infection that otherwise they were ordinarily able to resist. This announcement paved the way for prophylaxis through immediate repair. And not only that, it shed light on the frequency of epithelioma of the cervix and its prevention by the same prophylactic treatment. In the course of this treatment, he put in practice and elaborated the intelligent use of the hot water vaginal douche. No single agent has probably ever given more relief to suffering women than the hot water douche when properly administered. As a hygienic measure it has met with universal adoption.

In the field of plastic work upon the perineum, Dr. Emmet essayed the butterfly-denudation operation which many years predominated in restoration of the perineum, especially in our own country. This underwent many modifications in his own hands and at the suggestion of many operators until, with all its contemporaries, it has dropped into innocuous desuetude to be superseded by the direct muscle-stitching operation.

Dr. Emmet exploited every field of plastic work within the range of the gynecologist, studied its pathology, devised operative procedures, proved their efficiency, and described them with a perfection of detail that made

them acceptable to every skilled operator. For all time all operators who do plastic gynecological surgery will be under permanent obligation to Dr. Emmet. Undoubtedly, he did more than any one man to put it on a scientific basis. All succeeding operations have been an evolution from his work. He founded a school of pathology, of treatment, and of operative technique that was individually his, and he clung to its underlying principles to the end of his professional career.

Emmet was the pioneer that blazed the trail and opened the way for succeeding generations. But so ably have the new discoveries of science been applied to the principles he established, that within his lifetime practically all the details in the application of his inventions have been modified, sometimes beyond recognition, or succeeded by more scientific and successful methods. Gone are his cellulitis theory, his trachelorrhaphy which he practically abandoned for amputation, and now modified by the Sturmdorf operation, his perineorrhaphy, his traction and amputation of fibroid tumors, his buttonhole in the bladder for the relief of cystitis by drainage, and his operation for procidentia.

He lived to realize all this but fortunately his interest and thoughts had drifted away from medical and surgical themes, and he found interest and enjoyment in reducing to writing and illustrating with great artistic effect his *Personal Reminiscences of a Long Life*. He evidently experienced what is known as second memory and all the details of his boyhood, his schooldays and life's experiences are told with the freshness of yesterday's enjoyment.

Dr. Emmet showed his scholarly attainments in the clarity of his writings, the graphic word pictures of his operations, his pointed anecdotes, and his engaging conversation. As a patriot and a lover of his country, no loyalty could equal his zeal and devotion in perfecting the records of the signers of the American Declaration of Independence. Into this work he threw the same indomitable perseverance that brought him success in his surgical work.

THE TREATMENT OF CERTAIN CASES OF PLACENTA PRÆVIA BY CONSERVATIVE MEASURES [1]

By GEORGE W. KOSMAK, A.B., M.D., F.A.C.S., New York
Attending Surgeon, Lying-In Hospital

THE choice of a suitable topic for a paper to be presented to this Society was somewhat hampered by the restrictions imposed upon research work during the past year. Neither the desire to develop an original topic nor the means for carrying out the same were at hand during this period when the energies of those of us who did not enter the great struggle in a military capacity were concentrated on the relief of the civilian population. Our hospitals found themselves unable to do more than to merely care for patients—the lack of internes, nurses, and other factors requiring the attention of the attending staff to duties that could formerly be relegated to others.

The unsolved problems of obstetrics are still far from few and in addition to new ones there are many of the older in which better results must be worked out from the purely clinical standpoint. Among these there is none that demands our attention more than the subject of placenta prævia, on account of the deleterious effects of this complication on the mother as well as on the unborn child. In its extreme varieties it must be accounted as one of the most serious accidents of pregnancy and even in the less marked forms it constitutes a source of potential danger. The suddenness of the onset in totally unsuspected cases and the necessity for quick action calls forth an exercise of judgment on the part of the practitioner of obstetrics which is perhaps not equaled by any other demand in this field. The diagnosis once having been made, what shall be the most satisfactory method of treatment? Shall we proceed in a radical fashion according to the recent dictates of several authors, or shall we temporize; shall we disregard the interest of the baby entirely, or shall we endeavor to save the same by a necessarily mutilating operation on the mother? Since the perfection in methods of performing the abdominal cæsarean section, this has been widely advocated as one of the most satisfactory methods of relief in this condition and in a limited class of cases it is undoubtedly of value. The older measure involving the Braxton-Hicks version with perforation of the placenta and the use of the fœtal thigh as a tampon hardly seems a fair procedure in view of the certainties attending the classical cæsarean section and is becoming generally discarded except in emergencies. The primary danger to the mother from hæmorrhage and shock and the secondary risks from sepsis and embolism have been the deciding factors in selecting any method of treatment, and all deliveries by the vaginal route are overshadowed by these possibilities. In primipara presenting a rigid and only slightly dilated cervix and the probability of a central placenta prævia with the child at or near term and still in good condition, because the amount of bleeding has not been extreme, there is no question but what the abdominal cæsarean section offers the best method of delivery for both mother and fœtus. But it will be found that the large majority of cases are outside of this group; that we are not dealing with central implantations of the placenta but those in which merely a portion of this organ impinges upon the region of the internal os or the lower uterine segment, so that hæmorrhage of any extent results only after the cervix has become thoroughly softened and is dilating. Nevertheless even in this group the amount of bleeding may be sudden and excessive, especially as the lower uterine segment in multiparæ, in whom we most often find this abnormality, is thoroughly softened and separates easily from the placenta.

As the first consideration in any given case is to stop the hæmorrhage, the vaginal pack seems to offer a ready solution, especially

[1] Read before the American Gynecological Society, Atlantic City, June 16, 1919.

as its application is usually an emergency one. Unfortunately we find that in many cases admitted to our hospitals in whom this procedure has been resorted to, the blood saturates the substance of the gauze or absorbent cotton ordinarily employed and allows for the collection of large clots above the packing without control of the hæmorrhage. The pack moreover acts as a stimulus to uterine contractions and as the membranes are often unruptured the presenting part is not satisfactorily forced down against the bleeding area in order that it may act as a check on the same.

The use of the elastic bag in place of the gauze pack has been widely advocated and unquestionably good results have followed its employment. The usual procedure directs the insertion of the bag through the ruptured bag of membranes or through the mass of the placenta, with or without traction on the same to insure compression. In criticising the mechanics of this procedure attention must be called to the fact that such compression of the bleeding area in the lower uterine segment is necessarily indirect, because the soft placental mass remains interposed between the bag and the uterine wall and more or less continuous bleeding, although only slight, is usually present. In the attempt to introduce the bag it has been my experience at least, that considerable bleeding may result from this effort because of the undue placental separation brought about by the same. We also find that if strong labor pains fail to be induced, the bag is not firmly held against the placenta unless traction is applied and if the latter is not carefully guarded a sudden laceration or rupture of the lower uterine segment may take place.

In view of the shortcomings and the desire for a possibly more satisfactory method of treatment along these lines, what modification of such method can be advocated as a substitute? It must be borne in mind that it is essential to bring about gradual dilatation of the cervix without laceration, to reduce the possibility of hæmorrhage as much as possible, to avoid septic infection and, of course, to deliver a liuing child. Unfortunately the amount of bleeding which the patient has undergone in most cases before any method of delivery can be applied, results in a considerable degree of fœtal asphyxia, so that we ought not to weigh equally the chances of the child against those of the mother. Sepsis, as often noted, is particularly prone to occur in placenta prævia cases and may be ascribed to the manipulation and lacerations in a woman whose resisting powers are necessarily lowered by hæmorrhage. Control of the hæmorrhage during the process of dilatation remains the important indication and this I believe can be more effectively made by the extra-ovular introduction of the bag than by any other means.

My attention was first called to this method by its description in the textbook published by E. B. Cragin shortly before his death. In reading this description I was struck by the good results which he claimed for the method, and while at first skeptical of its value I soon afterward began to employ the method. Although not an infallible procedure, I believe that a thorough trial will convince everyone of its practicability and value in the majority of cases. It is for this reason that I have ventured a preliminary report on the procedure, in the expectation of publishing a more complete study at a later date. I have now become impressed with the fact that as an emergency measure it is much superior to the intra-ovular introduction of the bag because less harm is done by hospital internes or others, for example, than if the perforation of the placenta with a Braxton-Hicks version or intra-ovular introduction of the bag is carried out. As soon as a diagnosis is made no further manipulations are necessary in attempting to enter the amniotic cavity and the bag may be introduced through the os alone very much more quickly.

A few words of direction may be opportune at this point. The patient is quickly prepared by shaving the vulva, and scrubbing or the application of iodine. She is then placed in the lithotomy position. An anæsthetic is usually unnecessary. A large sized Voorhees bag folded upon itself and held by an introducer is inserted directly into the cervix and preferably introduced on that side away from the placenta. This is not essential, however,

and I have usually directed the distention of the bag as soon as the greater mass of the bag has entered the os. The clamp is removed and warm sterile water injected slowly so that the bag adjusts itself in the direction of least resistance, which is usually under the membrane rather than the placenta. Two fingers of one hand should be kept in the vagina so as to guide the inflating bag, otherwise it may be displaced into the vagina rather than find its way into the lower uterine cavity. As soon as the distention is complete the stem is firmly tied and placed in the vagina. It is not necessary to have it project from the vulva or to attach a weight to the same. I believe that this increases the dangers of infection and laceration. It is remarkable how quickly even actively bleeding cases show a checking of the hæmorrhage. Pains, if not present, usually begin within an hour and the labor proceeds without the loss of additional blood. A careful watch must be kept on the patient and it may be advisable to make a vaginal examination at least every two hours. As soon as the bleeding reappears an immediate examination should be made because this usually points to the expulsion of the bag. If this is not done considerable blood may be lost because the bag is no longer in place. In many instances rupture of the membranes occurs spontaneously about this time in the incomplete varieties of placenta prævia and the presenting part engages and descends. There need not be any haste manifested and the labor may be allowed to be completed normally. The further steps in delivery depend on the conditions present. Where engagement and descent are prevented, a version with breech extraction may be considered but it seems safer to allow labor to proceed normally for the child is often considerably asphyxiated and undue lacerations to the maternal soft parts may result from the rapid delivery. More dangerous hæmorrhages unquestionably result from deep cervical tears than from the placental site. Bleeding may occur immediately after the delivery of the child, but I think it is advisable to conserve the patient as much as possible and have therefore advocated the immediate expression of the placenta, followed by the injection of 1 or 2 cubic centimeters of pituitrin or the administration of ergot by mouth, if prompt uterine contraction does not result. Every placenta prævia case should be carefully watched for postpartum bleeding, but in the series of cases treated by this method, intra-uterine packing has rarely been required. As cervical lacerations are unlikely it is not necessary as a rule to examine the cervix and intravaginal manipulation is, therefore, avoided. Perineal lacerations are also unlikely, as in the majority of cases we are dealing with multiparæ.

It is not my purpose to recount in detail here the cases in which the extra-ovular insertion of the bag has been employed, but three typical instances in which the method was used are, however, presented.

Mrs. L. M., age 37, IV-para, near term, with a history of previous normal pregnancies, labors, and puerperal periods. Two weeks prior to admission to the hospital the patient bled profusely. A physician was called who gave her some medicine, after which the bleeding stopped. Three days before admission the bleeding started again and her physician then packed the vagina and sent her to the Lying-In Hospital, on March 7, 1919. On admission she was found to be very pale, moderately shocked. No fœtal heart heard. Red blood cells showed a count of less than 3,000,000, with a hæmoglobin of 35 per cent. A marginal placenta prævia was diagnosed, the cervix two fingers dilated, the patient having slight pains. At 10:30 a.m. a No. 4 Voorhees bag was inserted extra-ovularly, which stopped the bleeding at once and induced strong uterine contractions. The bag was expelled at 1:40 p.m., followed by rupture of the membranes and the immediate engagement and descent of the head. In view of the patient's anæmia 700 cubic centimeters of citrated blood was given at 2:30 p.m., and at 3:20 p.m. an easy forceps delivery of a large dead baby was done. The placenta was readily expressed and the uterus packed with iodoform gauze. The patient made an uninterrupted recovery but continued to bleed slightly after she was up.

This case may be regarded as typical, for a large amount of blood had been lost previous to delivery and any rapid method of extracting the child would undoubtedly have resulted in complete collapse of the patient. The ease with which the cervix dilated and the complete stoppage of the bleeding undoubtedly was the cause of saving her life.

Mrs. C. J., VI-para, six to seven months pregnant, admitted to the hospital after she had lost considerable blood. Examination showed apparently a central placenta prævia and one finger dilatation. A No. 3 Voorhees bag inserted extra-ovularly was expelled four hours later with full dilatation. Membranes were then ruptured but the head did not engage promptly and a version and breech extraction were done with a living child.

A XI-para, was recently delivered at the New York Lying-In Hospital, who two weeks previously had been sent in for bleeding, the source of which could not be determined. As it ceased after two days' rest in bed and the fœtal heart was good, the patient was allowed to go home. She was readmitted two weeks later with slight bleeding; the cervix being then dilated, the diagnosis of placenta prævia of a central variety was made. She was treated by the extra-ovular bag method and after full dilatation was secured, the membranes were perforated alongside of the placenta, a version done and a living child obtained. The total amount of blood lost was comparatively slight and perhaps no more than in any ordinary labor.

A résumé of the cases of placenta prævia taken from the records of the New York Lying-In Hospital from June, 1904, to December 31, 1918, showed a total of 534. Among them there are recorded 75 deaths of mothers (14 per cent) and 105 deaths of children after delivery. A total of 223 stillbirths is recorded, making a total fœtal mortality of 328, or 62 per cent. These cases were treated by a variety of methods other than the extra-ovular bag insertion. While this is rather an alarming proportion of both maternity and fœtal deaths, the fact must be borne in mind that a great many of these cases were sent in by outside physicians after various methods of treatment had been employed, and usually considerable hæmorrhage had resulted. I am not prepared to state at the present time how many of the mothers died of sepsis and how many of hæmorrhage. In most of the cases that were admitted to the hospital from outside sources, the physician in attendance has usually tamponed the vagina in an effort to stop the bleeding, but this procedure is rarely efficacious, the tampon material being insufficient and not properly placed. This attempt at checking the hæmorrhage is unproductive of results and under the environment in which it is employed is a factor of great danger to the patient, namely, septic infection. It has also been noted in many of these cases that a history of bleeding has been present for varying periods, from a few days to a few weeks, but notwithstanding this warning nothing has as a rule been done to discover the source of the same. While admitting the difficulty of making a diagnosis in cases of undilated cervix, the fact that bleeding is present should induce greater care on the part of the attending physician. If the patient is unable to have proper care in her home, she should be referred to a hospital until a diagnosis can be established.

The personal cases previously referred to are but three examples of about ten consecutive cases of placenta prævia which I have observed with the extra-ovular bag method. Although insufficient in number to permit of general conclusions, they have impressed me with the value of the procedure, and in calling attention to a method which has not been very extensively used and is purely obstetrical in character, it is with the hope that it may be given a more extensive trial by others. It seems particularly adapted to multiparæ with moderately softened cervices, is readily applied, does not of itself cause additional bleeding, reduces the necessity for extensive manipulations, is free from shock, and safer and more efficient for emergency use.

A STUDY OF FROZEN SECTIONS OF THE PELVIS WITH DESCRIPTION OF AN OPERATION FOR PELVIC PROLAPSE*

By ALFRED BAKER SPALDING, M.D., San Francisco
From the Division of Obstetrics and Gynecology of the Standard School of Medicine

THE descriptions of the fasciæ of the female pelvis, as found in most standard textbooks on anatomy, are frequently confusing and always unsatisfactory. They are usually printed in small type, and barely cover the variations from the male pelvis, which is far more clearly described. This perhaps accounts for the fact that to many operators the pelvic fasciæ seem to have only vague anatomical and physiological value, and only limited, if any, surgical utility.

According to Halban and Tandler, the pelvic fasciæ may rupture immediately behind the symphysis giving rise to a sliding cystocele or urethrocele, or between the cervix and the bladder permitting cystocele with prolapse of the uterus, or between the cervix and the rectum as seen in some cases of prolapse with rectocele, or finally behind the rectum causing prolapse of the rectum.

A year ago, Chipman, in an address before this society, designated these conditions as sacropubic herniæ and described a method for closing the various hernial openings. Of recent years several other good methods for the cure of pelvic hernia have been proposed. Some of these operations, however, serve only to cure the cystocele, while permitting the prolapse of the uterus to recur, while others support the uterus without curing the cystocele. A few operations seem to owe their popularity more to the ease and rapidity with which they can be carried out than to the degree of permanent relief the patient may obtain. The entire subject of pelvic prolapse is a complex one and while it is self-evident that very often the lacerated, overstretched, atrophic meshwork of fasciæ and muscles of the pelvic diaphragms cannot be restored to anatomical completeness, still it is also clear that a knowledge of the anatomy of the pelvic fasciæ and muscles is a help in operating, and an understanding of the close relation existing between the pelvic fasciæ and the many venous plexus is of aid in preventing such postoperative complications as hæmorrhage, pelvic hæmatoma, sloughing and fistula formation.

For these reasons and for the purpose of correlating the surgical values of the various pelvic fasciæ with anatomical descriptions, I have made a study of the pelvis of a 32-year-old nullipara which had been frozen and cut into four segments.[1]

The first section of this pelvis begins at a point 4.5 centimeters above the symphysis on the abdominal wall, passes downward and backward through the acetabula laterally, to end in the coccyx, just below the sacrococcygeal joint. The plane is slightly higher on the right side. It passes above the bladder in front, severs the uterus just below the internal os, and the rectum posteriorly. The distended rectum has dislocated the cervix somewhat to the right. The upper surface of the first segment has been photographed, as shown in Figure 1.

A strong thick mass of vascular tissue surrounds the cervix. On either side can be seen the superior edge of the obturator internus muscle covered by the obturator fascia. The levator ani muscles do not appear at this level, but a thin band of coccygeus muscle can be seen posteriorly. Overlying the obturator fascia is the pelvic fascia which passes under the peritoneum to the sides of the bladder to form its lateral true ligaments. On the right side of the rectum the sacro-uterine ligament is seen quite well developed.

The second section passes in a plane 2 centimeters below the first. It severs the bladder, the external os of the cervix, the vagina and the rectum, passing to a point just below the tip of the coccyx. Figure 2

[1] The pelvis was prepared for study by Dr. Frank Blaisdell of the Division of Surgery, at Stanford.

*Read before the American Gynecological Society, Atlantic City, June, 1919.

Fig. 1. Section of pelvis, 4.5 centimeters above symphysis, through acetabula to coccyx. Bladder lies under peritoneum. Cervix sectioned at internal os. Obturator internus muscles are seen on either side of paracervical tissue. Coccygeus muscles are posterior to rectum. On right side is sacro-uterine ligament, from cervix to side of rectum.

Fig. 2. Section of pelvis, 2.5 centimeters above symphysis, to point just below coccyx. Shows lower surface of segment made by the first and second sections. The bladder is sectioned at level of external os of cervix. The obturator internus and the levator ani muscles are seen on either side. On the right side the fascia endopelvina can be seen passing from the bladder, vagina, and rectum to the pelvic fascia lying on the fascia over the obturator internus muscle, to form the arcus tendineus. A little lower is the arcus tendineus musculi levatores ani.

is from a photograph of the lower surface of the first segment, and Figure 3 from a photograph of the upper surface of the second segment. The anterior true ligaments of the bladder are seen well developed. Also the lateral true ligaments of the bladder are present. Both of these ligaments can be traced into the fascia called the endopelvina, which joins the pelvic fascia to form a line of thickened, tough, fibrous structure

Fig. 3. Section through pelvis, 2.5 centimeters above symphysis, to point just below coccyx. Shows upper surface of segment made by second and third sections. The bladder with its anterior and lateral true ligaments is seen anteriorly. The vagina with the tip of the cervix is supported on either side by the fascia endopelvina which joins the pelvic fascia lying on the obturator fascia to form the arcus tendineus. Between the bladder and the vagina is a vascular layer of fascia 1.5 centimeters thick Surrounding the rectum is the levator ani muscle attached on either side to the obturator fascia at the arcus tendineus musculi levatores ani.

Fig. 4. Section, 1 centimeter above symphysis, through anal canal posteriorly. Shows lower surface of segment made by second and third sections. Anteriorly is the posterior surface of the symphysis. The high attachment of the fascia endopelvina, and the levator ani muscles to the obturator fascia, pulls the urethra, vagina, and anal canal close to the lower edge of the symphysis.

called the arcus tendineus or white line. On either side is the well-developed obturator internus muscle covered with its fascia. About midway posteriorly, at a point which is somewhat lower than the arcus tendineus, can be seen the origin of the levator ani muscle from the obturator fascia, forming a less well marked white line called the arcus tendineus musculi levatores ani. These muscles surround the rectum, some fibers

Fig. 5. Section. 1 centimeter above symphysis, through anal canal posteriorly. Shows upper surface of segment made by third and fourth sections.

passing to a point near the tip of the coccyx. Of surgical interest is the layer of vascular fascia, nearly 1.5 centimeters thick, which lies between the bladder and the vagina and joins the fascia endopelvina at the true white line. This fascial layer appears to be intimately interwoven into the walls of the bladder and the vagina, but with care can be separated without hæmorrhage from each. The overlapping of this fascia after separation from both the bladder and vagina as far as the white line, gives exceedingly strong support to the bladder when herniated as in cystocele. Between the rectum and the vagina the same vascular, fascial layer somewhat less in thickness than that between the bladder and the vagina, can be seen, as well as the thick levator ani muscles, covered above and below by fascia which joins the obturator fascia at the point of origin of the levator ani muscles.

The third section of the pelvis passes 1.5 centimeters below the second section at the ventral point, and 2 centimeters below at the dorsal point. On the ventral point the section begins just above the symphysis pubis, passes downward and backward along the posterior surface of the symphysis to sever the urethra at the base of the bladder, the vagina and the anal canal. The fascial planes shown in Figures 1, 2, and 3 are here seen in continuation in Figure 4 which is a photograph of the lower surface of the second segment. The urethra and the base of the bladder are strongly attached to the lower part of the symphysis and the vascular fascial walls of the vagina are attached along the anterior cornua closely to the arcus tendineus.

The fourth and most inferior section of the pelvis was made parallel to the above, 2 centimeters lower and passes along the anterior surface of the symphysis to sever the urethra and vagina near the vulvar orifice. It shows, in part, the joining of the fascia of the vaginal walls with the deep layer of the triangular ligament.

The uterus as shown in Figure 1 is suspended at the internal os by a mass of parametrial tissue, which includes the sacro-uterine and the cardinal ligaments. This tissue is intimately attached to the curved arcus tendineus of the pelvic fascia. The arcus tendineus also gives attachment to the vascular fasciæ between the vagina and bladder and the vagina and rectum which hold up and support the bladder and rectum. The levator ani muscles and fasciæ pull the lower portion of the vagina and rectum toward the symphysis, as seen in Figure 3, and by their sphincteric action give potential support to the bladder, uterus and rectum.

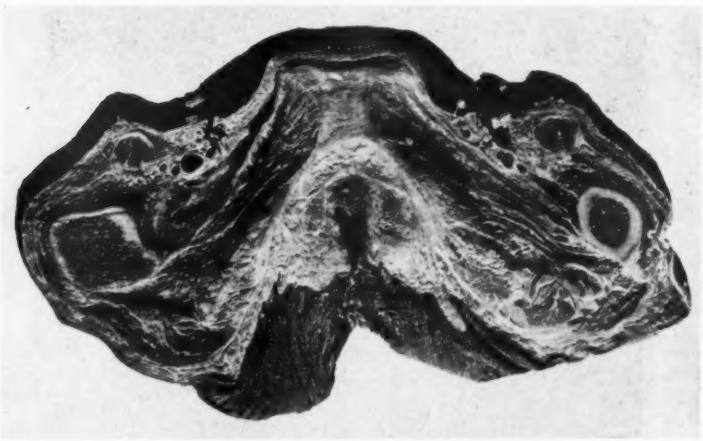

Fig. 6. Section along anterior surface of symphysis.* Shows lower surface of segment made by third and fourth sections. Fascia of vaginal walls joins deep layer of triangular ligament.

Above the internal os are structures not shown in these frozen sections. The broad ligaments undoubtedly aid in supporting the uterus; partially by direct and partially by indirect action. In conjunction with the round ligaments, they pull the fundus of the uterus forward which carries the cervix and the structures around the cervix to the hollow of the sacrum. With the uterus in this position intra-abdominal pressure helps to support the pelvic organs by leverage action.

A year ago, Rawls, in a paper on "Cystocele," covered the literature on the operative history for the cure of sacropubic herniæ. In this list was the operation described by Watkins of interposing the uterus between the bladder and the vagina, and the modification, suggested by Jellett, of dissecting, *per vaginam*, the sacro-uterine ligaments and transplanting them to the anterior surface of the uterus. Some years ago these operations were utilized in the Women's Clinic at Stanford, in an effort to cure marked conditions of prolapse, with cystocele and rectocele. In general, good results were obtained, but occasionally, following the dissection of the sacro-uterine ligaments, postoperative hæmatomata would form, giving a stormy convalescence, which required in some instances further operative interference for the relief of pain, or for the purpose of drainage. Without the Jellett procedure, several patients operated upon by the Watkin's technique suffered with recurrence, particularly in regard to the cervix and rectum. Resort was then made to the Goffe operation, which consists in removing the uterus *per vaginam*, suturing the rather crushed stumps of broad ligaments together, and suspending the bladder by sutures to the round and broad ligaments. It was our unfortunate experience to have some cases of postoperative fistula form at the site of one or other of the bladder stitches. In one instance this resulted in an ureteral fistula. At the same time we saw several patients operated upon elsewhere by vaginal hysterectomy, who suffered with a recurrence of cystocele and whose ultimate cure depended upon very delicate dissection and overlapping of the pelvic fascia in the anterior vaginal wall. Despite these dangers we have followed quite a large series of patients operated upon by the procedures of Jellett or Goffe who have had no recurrence for over a period of seven years. In April, 1917, J. Craig Neel [1] presented before the meeting of the California State Society a method of dissecting the

[1] California St. J. Med., xv, 121.

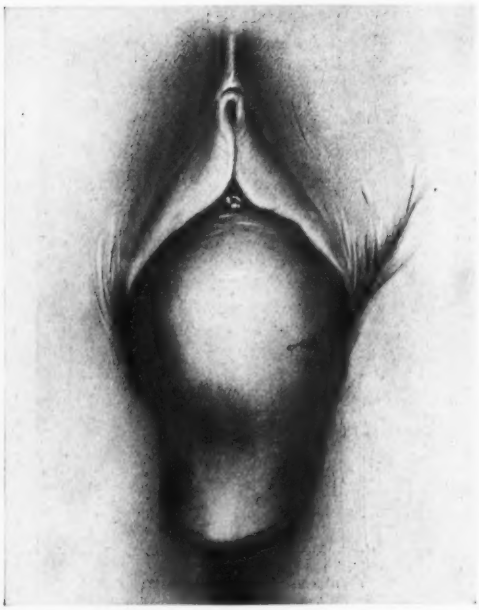

Fig. 7. Prolapse of the uterus with marked cystocele. From a drawing made at the time of operation. Marked rectocele was present but not shown by artist.

Fig. 8. The cervix is incised transversely at the bladder junction and the fascia separated from the bladder with scissors, to the urethral opening.

fascial layer in the anterior vaginal wall, and of overlapping this fascia according to the method presented independently a year ago to this society by Rawls.

During the past two years I have utilized this procedure for the cure of cystocele with excellent results, and recently have combined it with amputation of the cervix and subtotal vaginal hysterectomy for the cure of prolapse of the uterus with cystocele and rectocele. This technique is more effective and less dangerous than total hysterectomy. It preserves the invaluable paracervical fascia and ligaments and avoids the dangers of hæmorrhage, sloughing, and fistula formation.

The operation has been applied to all degrees of uterine prolapse, with cystocele and rectocele, where it was permissable to remove the uterus. It depends for success on attaching to the cervical stump the sacro-uterine, broad and round ligaments, *per vaginam*, the round ligaments being drawn through the cervical canal and sutured to the raw surface of the amputated cervix before closing the vaginal flaps. The supravaginal portion of the cervix, which has attached to it the all important, supporting structures at the base of the broad ligament, becomes so fixed in scar tissue later, that it cannot be drawn down with instruments by vaginal examination. It also forms an important supporting point for the attachment of the overlapped fascia between the vagina and bladder and for the less strong fascia between the vagina and rectum.

The various steps of the operation are carried out in the following order:

The fascia, overlying the cystocele, is exposed by a deep transverse incision across the cervix at the bladder junction, as shown in Figure 8. If this incision be superficial, the strong fascial plane will remain attached to the bladder. The vaginal wall with the fascia is separated from the bladder rather widely laterally. Before opening the peri-

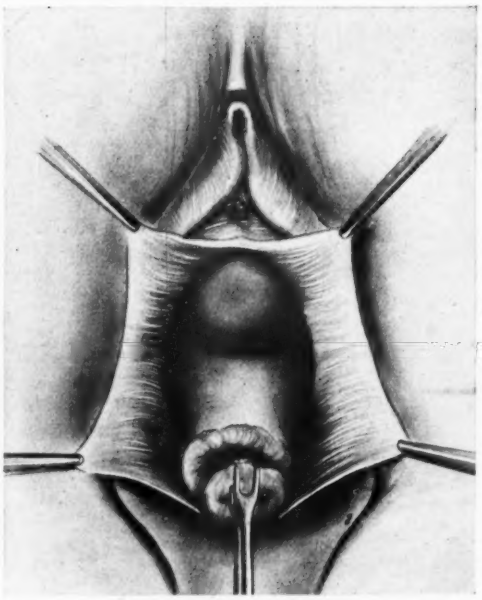

Fig. 9. Before opening the peritoneum, the cervix is amputated, removing the mucous membrane of the cervical canal.

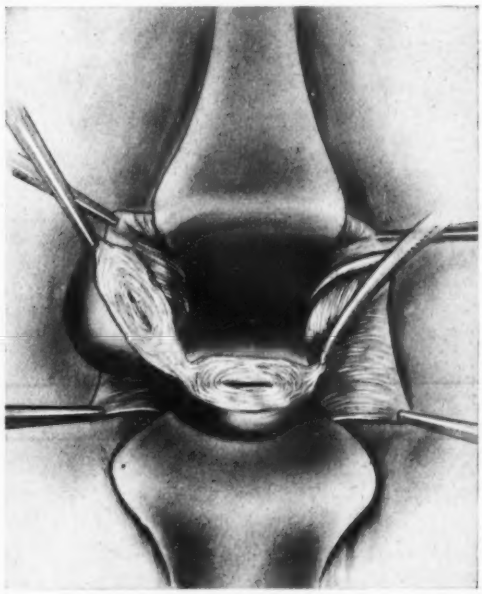

Fig. 10. The bladder is held away and abdomen packed. The fundus of the uterus delivered and amputated above the internal os. Mucous membrane of cervix removed.

toneum, the bladder is pushed up and the vaginal portion of the cervix removed as a cone (Fig. 9) according to the method of Hegar. A stitch is placed on either side of the cervix to ligate the vaginal branches of the uterine vessels, and the posterior half of the cervix is covered by a vaginal flap. The next step consists in opening the peritoneum and lifting the bladder away with a broad Doyen retractor. The fundus of the uterus is delivered as in an interposition operation; the round ligaments cut and tied with long catgut ligatures; the broad ligaments are clamped, close to the uterus, as far as the internal os and the fundus of the uterus removed by amputation (Fig. 10). This exposes the sacro-uterine ligaments which are shortened if necessary. The stumps of the broad ligaments are sutured to the cervix (Fig. 11) and the cut round ligaments carried through the cervical canal and sutured to the inferior surface of the cut cervix (Fig. 12). The mucous lining of the cervix is removed previous to this procedure. This pulls the cervix high and gives some

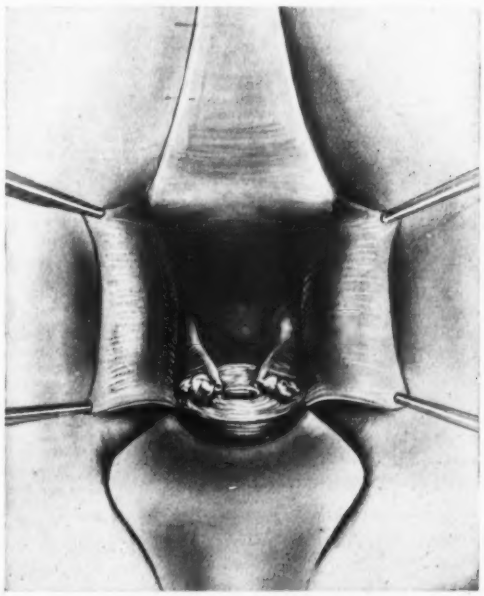

Fig. 11. The stumps of the broad ligaments have been sutured to cervix. The peritoneum of bladder could be sutured at this time to the posterior surface of cervix.

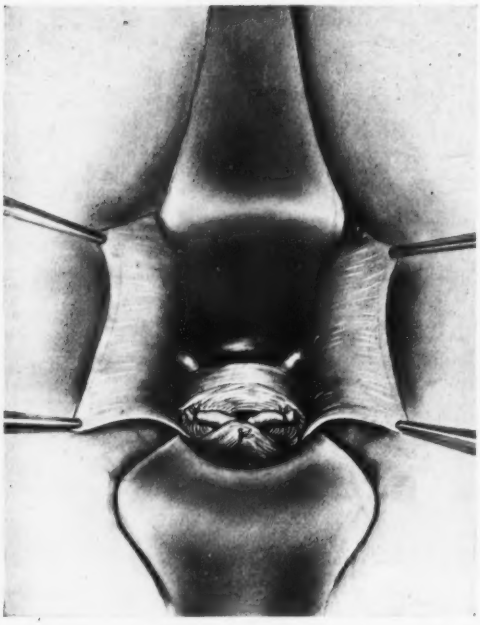

Fig. 12. The long ligatures attached to the round ligaments have been drawn through cervical canal and the cervix pushed upward until the round ligaments appear at lower opening. The round ligaments have been sutured to the cervix and the posterior part of the cervix has been covered by a vaginal flap.

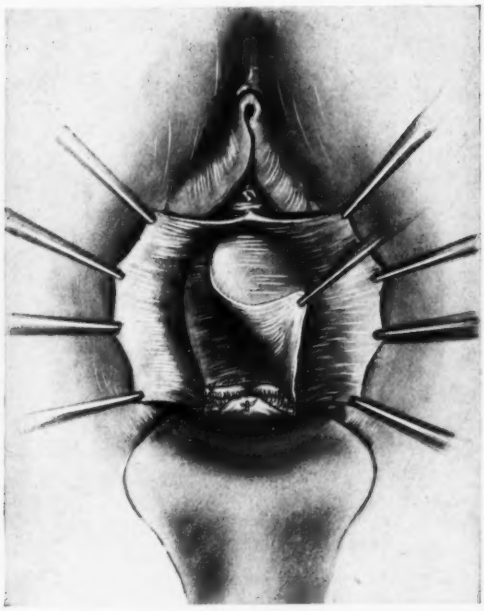

Fig. 13. The fascia has been dissected from the mucous membrane of the vagina to the arcus tendineus and overlapped with four mattress sutures. The free edge of fascia is sutured over the cervix and opposite fascial layer with continuous suture.

support to the lateral walls of the bladder when removing the retractor. The fascia in the anterior vaginal wall (Fig. 13) is now dissected and overlapped as described by Neel and Rawls, and sutured to the stump of the cervix. This completely closes the bladder hernia. The mucosa is sutured by means of a few interrupted catgut sutures over the fascia and the anterior half of the cervix.

If the rectum is prolapsed, the posterior vaginal wall is incised from the fourchette to near the cervix and the rectal hernia closed by suturing with a lifting stitch the prolapsed rectum to the sacro-uterine ligaments on either side. Where possible the fascia between the rectum and vagina is sutured and the vaginal flaps closed. The levator ani muscles are brought together at the pelvic outlet together with their fascial coverings which close the vulva to normal. Finally, the vagina is rather firmly packed for 24 hours.

So far, the patients operated upon according to this technique have had no serious complications. Bleeding at the time of operation has been slight and there have been no infections or hæmatoma formations. Not infrequently, however, there has been difficulty in voiding for from 10 to 14 days. On discharge, the cervix has been found high posteriorly, with the bladder and rectum well supported. Sufficient time has not elapsed to express a positive opinion, but from present indications, the preservation of the cervix and the paracervical tissue, supported by the broad and round ligaments with the overlapping of the fascial layers, gives promise of value for the cure of those patients suffering with prolapse and cystocele in whom the sacrifice of the uterine body is not contra-indicated.

OVARIAN RESIDUE[1]

By WILLIAM P. GRAVES, M.D., F.A.C.S., Boston

IN an article read two years ago before the Gynecological Section of the American Medical Association, it was claimed by the writer that there is manufactured in the general ovarian tissue an internal secretion equal in therapeutic value to that produced in the corpus luteum. The statement was presented in the form of a preliminary report, chiefly on theoretic grounds, with a promise to publish clinical data as soon as sufficient material might be collected to be of scientific worth. The object of this paper is to fulfill that promise.

The presentation of any clinical report on ovarian organotherapy must be made somewhat apologetically and with due modesty as regards any claims of strict scientific accuracy, for the chances of error in observation both on the part of the physician and the patient are so great that even the most carefully compiled statistics are in many instances only a little better than an expression of general impressions.

In order to avoid misleading conclusions it is always necessary to keep in mind the ways by which one is liable to fall into error. Inasmuch as the symptoms and conditions for the relief of which ovarian substance is therapeutically indicated, are chiefly of a purely human character, animal experimentation is for the most part excluded. In the treatment of such subjective symptoms as the vasomotor disturbances of the menopause, or the ovarian asthenias, or the diverse manifestions of dysmenorrhœa, one must rely in the tabulation of results on the patient's statements, which it must be admitted are frequently inaccurate. In treating the more objective irregularities of the menstrual flow, observations are somewhat more accurate, but here again the results of treatment are not subject to the inspection of the investigator, and the reported records in a given case must depend on the patient's personal statement, which is often vague.

Thus the clinical data appended to an article on organotherapy, like this one for example, savor decidedly of the patent medicine experiences detailed in the advertising columns of the daily papers and for this reason, quite justly perhaps, they have invited the criticism of those who are accustomed to more scientific methods of investigation.

Another serious handicap to one who is endeavoring to make a systematic test of ovarian substance is the difficulty encountered in securing reliable preparations. There are to be sure, certain excellent products on the market, but in prescribing them at random it is impossible to guarantee that the patient will receive an article that is even in a passable state of preservation. It seems to be little appreciated that all ovarian preparations, excepting possibly those in ampule form, deteriorate more or less rapidly, and it has been my experience that even the best dispensing pharmacists take few precautions to preserve them in a fresh state. The great diversity in the results observed in organotherapy, is undoubtedly largely due to this factor of ready decomposition of the material.

The difficulty in securing fresh material I have been able partially to avoid by the kindness of two wholesale drug manufacturers, who have furnished me with preparations so that it has been possible to dispense them free to patients. In this way not only was freshness of the product insured, but a greater regularity of treatment was attained than would have been possible by prescribing such high priced drugs as the ovarian extracts have come to be.

The term ovarian residue relates to that part of the ovary which remains after ablation of the corpus luteum, and has usually been discarded as valueless. I was led to make use of it as a therapeutic agent in the course of trying out various ovarian preparations. In my earliest experiments with ovarian therapy I had employed exclusively corpus luteum extracts, in accordance with the

[1]Read before the American Gynecological Society, Atlantic City, June, 1919.

belief then generally prevalent, that the active part of the internal secretion of the ovary is produced solely by the luteal cells. The results of this treatment were irregular and unsatisfactory though an occasional case responded successfully. In the light of later experience there seems to be no doubt that the ill success of these earlier trials was due, in part at least, to ignorance of the rapid deterioration of luteal products. It is not to be wondered at that Dr. Burnam, who was able to secure abundant fresh corpus luteum material attained far more brilliant and constant results than was possible for those who were dependent for their supply on the unreliable stocks of dispensing druggists.

My next experiments were with a dried preparation of the whole ovary put up in capsule form by a local drug firm. It was possible in this way to secure a uniform product in a reasonable state of preservation. Favorable results immediately appeared and with such constancy that the prescribing of ovarian extracts became an important feature in my gynecological practice. The superiority of the whole ovary preparation over those of corpus luteum, I at first ascribed theoretically, as did others, to a separate internal secretion elaborated in some part of the general ovarian stroma. Undoubtedly, however, the great improvement in the results was in a measure dependent on the greater uniformity and freshness of the material which I was able to control. It is also probably true that preparations of the whole ovary retain their therapeutic value somewhat longer than do those of the corpus luteum alone.

I next treated with desiccated corpus luteum from pregnant cows a series of about 20 cases having menopause symptoms. The treatment of these cases was almost universally unsuccessful, due chiefly to the production of active digestive disturbances which in a few instances were severe and protracted. Others, notably Burnam, have employed the corpus luteum of pregnancy with success though it is admitted by all that digestive disturbances are sometimes encountered. The failure in my own series of cases can be explained by the probability that the two particular lots of capsules which were sent under presumably favorable conditions, had become decomposed and that the patients had been treated to a mild form of proteid poisoning. It further supports the statement that corpus luteum preparations rapidly decompose, though this deterioration is to a certain extent delayed by the tablet form in which they are at the present day usually dispensed.

The ill success of the experience with the corpus luteum alone as compared with the excellent results from the whole ovary naturally led to a trial of the ovarian residue. As I have stated at length in other articles the use of ovarian residue as a therapeutic agent is not without a logical basis. There is good evidence that in the process of growth at least, the theca luteal cells of the atretic follicles are important agents in the manufacture of the ovarian internal secretion. The theca luteal cells which become activated in the physiological process of follicle atresia correspond to the segregated cells of the interstitial gland found in certain animals, and generally accepted as a source of internal secretion. Moreover the theca luteal cells of follicle atresia are known to be analogous to the cells of Leydig which elaborate the active secretory principle in the testicle. If it be accepted that the luteal cells of the corpus luteum are entirely or even in part proliferated from the connective tissue cells of the theca interna, it is reasonable to conclude that an internal secretion is elaborated both by the atretic follicles and the corpora lutea, which is identical in that it has the same histological source in both bodies. This theory would be confirmed if it could be shown that preparations of the ovarian residue produce clinical results identical with or similar to those produced by preparations of corpus luteum, and this confirmation seems to have been established by the results appended to this paper.[1]

By the kindness of Dr. Grant ovarian residue material was acquired and dispensed free to patient, careful notes were taken, and observations made as accurately as possible with the limitations mentioned above.

The immediate impression received by the writer in noting the results of administering

[1] Parke, Davis & Co.

ovarian residue was that though similar in action to the corpus luteum and whole ovary, and applicable to the same kinds of cases, its effects were somewhat more definite, and more constantly reliable than those from either of the other two.

Though not proved by experimentation *in vitro*, it has seemed evident that the residue retains its chemical integrity longer than the other preparations, and indeed it is entirely possible that its superiority in therapeutic value may be due to its greater resistance to decomposition.

In employing ovarian residue an endeavor has been made to secure as far as possible the ovaries of pregnant animals on the ground that follicle atresia is more active during pregnancy.

The number of cases reported is less than could be desired. This is due to the fact that on account of the exigencies of the war, the material furnished by one of the drug firms could no longer be obtained so that the work was long interrupted. I wish to express my indebtedness to Hynson, Westcott & Dunning, who have recently interested themselves in the work and who are now supplying me with abundant material.

In addition to the possible errors in a clinical report of this kind, it should be mentioned that there is in the ovarian residue a minute amount of corpus luteum substance, due to the fact that the corpora lutea are ablated by machinery and that small fragments are sometimes left behind. The amount of luteal tissue is, however, so insignificant that it could have but little effect on the results of treatment.

The present report as it stands is incomplete without a full comparison with the results from other ovarian preparations. This work is being done and will serve as a basis for a later paper.

It may be said here that I have a series of cases treated with whole ovary which nearly parallels those of the ovarian residue. The statistical results in these two series are so nearly alike that it is impossible to draw any absolute conclusions. However, the general impression received in using the two forms of ovarian therapy is in favor of the residue. A shorter series of cases treated with corpus luteum reveals a comparatively higher percentage of failures than in the use of the other two forms.

It is at present justifiable to conclude—

1. That the ovarian secretion is not solely confined to the corpus luteum, a view which some still hold.

2. That the secretion of the atretic follicles and the corpus luteum is a similar product being manufactured by analogous cells, namely by those proliferated from the internal theca.

3. That the ovarian residue preserves its chemical integrity longer than do those ovarian preparations which contain corpus luteum substance.

4. That under present conditions of preparation ovarian residue is in general superior in its clinical results to the commercial articles now on the market.

The brief case reports appended to this article are divided into three groups: first those exhibiting the symptoms of the natural and artificial menopause; second, those treated for such menstrual disturbances as amenorrhœa oligomenorrhœa, delayed menses and clotting; third those of essential dysmenorrhœa.

The majority of the cases of the first group were treated for postoperative hot flushes. In only a few of the cases were the symptoms severe, and in many they were not a source of complaint, being elicited only after questioning the patient. Ovarian residue was administered, therefore, in many instances chiefly for the purpose of testing its effects on these characteristic vasomotor manifestations. For hot flushes ovarian residue like the other ovarian preparations acts as a specific palliative rarely failing to give some relief. For those multiple neurosecretory symptoms such as dizziness, sleeplessness, headaches, muscular pains, buzzing in the ears, asthenia, etc., which are so common in the natural though not in the artificial menopause, ovarian residue is helpful in many cases.

In the first group there are in all 41 cases and there is good evidence that the treatment exerted a definite beneficial action in 32, or in 78 per cent.

In the second group of amenorrhœas, etc.,

there were failures, especially in the long standing cases of amenorrhœa. In some instances of delayed menses and clotting the results were rather striking. Even in the amenorrhœa cases in which the menstrual rhythm could not be re-established, the patients often mentioned the general tonic effect of the treatment. This was especially true where other pluriglandular disturbances were evident. The stimulating effect of the ovarian residue could sometimes be enhanced by the addition of thyroid, and the anterior lobe extracts.

The third group of essential dysmenorrhœas is quite incomplete, due to the fact, that I have only recently used the residue in the treatment of this important disorder. Most of the cases here appended, represent patients who have not been relieved of their menstrual symptoms by surgical measures. It will be seen that even in these the ovarian residue exhibits a distinct therapeutic value. I am now treating a considerable number of dysmenorrhœa cases of the acute anteflexion type with the hope of avoiding operative interference, but sufficient time has not yet elapsed to warrant definite conclusions.

NATURAL AND ARTIFICIAL MENOPAUSE

CASE 1. Mrs. F. W. Ovarian residue (P. D.) for hot flushes after hysterectomy for fibroid and pelvic inflammation. Report from patient: Effect is wonderful. Also marked tonic effect.

CASE 2. Miss L. W. Ovarian residue (P. D.) for hot flushes following hysterectomy for large fibroid. Report from letter: Greatly improved.

CASE 3. Mrs. A. A. Ovarian residue (P. D.) for natural menopause symptoms. Report by letter: Great improvement. Return of symptoms when not taking capsules.

CASE 4. Miss M. N. B. Hot flushes following hysterectomy for fibroid, relieved by ovarian residue (P. D.). No relief from corpus luteum when given as alternative.

CASE 5. Miss S. C. Ovarian residue (P. D.) for hot flushes following hysterectomy for cancer. Report Hot flushes reduced but not completely cured.

CASE 6. Miss S. F. C. Ovarian residue (P. D.) for hot flushes following hysterectomy for fibroid. Report by letter: Favorable results.

CASE 7. Mrs. K. W. C. Ovarian residue (P. D.) for hot flushes following hysterectomy for pelvic inflammation. Cured.

CASE 8. Mrs. C. P. C. Ovarian residue (P. D.) for hot flushes following hysterectomy for multiple fibroid. Report by letter: Very much improved, hot flushes nearly disappeared.

CASE 9. Mrs. J. D. D. Ovarian residue (P. D.) sleeplessness following hysterectomy for chronic pelvic inflammation. First report negative. Second report: Greatly improved.

CASE 10. Mrs. C. C. D. Ovarian residue (P. D.) for hot flushes following hysterectomy for chronic pelvic inflammation. Report: Complete relief.

CASE 11. Mrs. M. D. Ovarian residue (P. D.) for natural menopause symptoms. Report: Greatly improved by treatment.

CASE 12. Miss I. D. Persistent hot flushes following hysterectomy; very neurotic. No result from ovarian residue (P. D.), corpus luteum (H. W. & D.), ovarian extract (Armour). Some relief from ovarian residue (P. D.) given hypodermically.

CASE 13. Mrs. E. N. H. Ovarian residue (P. D.) for hot flushes following hysterectomy for pelvic inflammation and ovarian cysts. Greatly relieved.

CASE 14. Mrs. P. H. Ovarian residue (P. D.) for hot flushes following hysterectomy for large fibroid. Capsules gave digestive disturbances and were discontinued.

CASE 15. Miss A. H. Ovarian residue (H. W. & D.) for hot flushes following radium treatment for fibroid. Relief.

CASE 16. Miss E. H. Ovarian residue (H. W. & D.) for hot flushes following hysterectomy for large ovarian cysts. Complete relief.

CASE 17. Mrs. A. J. Ovarian residue (P. D.) for hot flushes following hysterectomy for severe menorrhagia. Greatly relieved.

CASE 18. Mrs. O. J. Ovarian residue (H. W. & D.) for hot flushes following hysterectomy for uterine fibroid. Menopause two years before operation. Complete relief.

CASE 21. Miss S. L. K. Ovarian residue (P. D.) for hot flushes following supravaginal hysterectomy for large fibroid. No improvement at first, later complete relief.

CASE 22. Miss H. K. Ovarian residue (P. D.) for natural menopause. No effect, treatment gave digestive symptoms.

CASE 23. Mrs. G. W. K. Ovarian residue (P. D.) for hot flushes following supravaginal hysterectomy for fibroid with chronic pelvic inflammation. Hot flushes increased by treatment. Later improved with corpus luteum (H. W. & D.).

CASE 24. Mrs. B. B. L. Natural menopause symptoms. Excellent results from ovarian extract (Armour) and ovarian residue (P. D.)

CASE 25. Mrs. P. H. M. Ovarian residue (P. D.) for hot flushes following hysterectomy for chronic pelvic inflammation. Greatly improved, some digestive disturbances.

CASE 23. Mrs. E. M. Ovarian residue (P. D.) for hot flushes following hysterectomy for large fibroid. Greatly improved.

CASE 27. Miss J. M. Ovarian residue (H. W. & D.) for hot flushes following operation for fibroid in which ovaries had been left *in situ*. Complete

relief. Hot flushes returned after discontinuing treatment.

CASE 28. Miss M. P. Hot flushes following hysterectomy for chronic pelvic inflammation, very neurotic. No relief from ovarian extract (Armour), ovarian residue (P. D.) followed by marked improvement for 3 months. Return of hot flushes not relieved by ovarian residue (P. D.), either capsules or hypodermically.

CASE 29. Mrs. T. P. Ovarian residue (P. D.) for hot flushes following supravaginal hysterectomy. No effect.

CASE 30. Mrs. W. H. W. Ovarian residue (P. D.) for natural menopause symptoms. No results.

CASE 31. Mrs. W. L. W. Ovarian residue (P. D.) for molimina following hysterectomy with implantation. No results.

CASE 32. Mrs. M. T. S. Ovarian residue (P. D.) for natural menopause symptoms. No special effect.

CASE 33. Mrs. S. Operation in 1910 for uterine fibroid, both ovaries left *in situ*. Cancerous cyst developed in both ovaries. Operation 1916. Removal of cancerous cysts. Operation followed by hot flushes, which were immediately and completely relieved by ovarian residue (P. D.). The patient died of recurrent cancer.

CASE 34. Mrs. P. S. Ovarian residue (P. D.) for hot flushes following hysterectomy for chronic pelvic inflammation. Complete relief.

CASE 35. Miss B. S. Corpus luteum (H. W. & D.) for hot flushes following hysterectomy for large ovarian cysts. No effect from corpus luteum or ovarian residue.

CASE 36. Miss A. S. Ovarian residue (P. D.) for hot flushes following hysterectomy for large adherent fibroid. Greatly improved. Flushes return when treatment is discontinued.

CASE 37. Mrs. W. H. R. Hot flushes following hysterectomy for fibroid. Ovarian extract (Armour) no relief. Mixed Gland No. 2 (B. & W.) and ovarian residue (H. W. & D.): Complete temporary relief.

CASE 38. Mrs. G. W. R. Ovarian residue (H. W. & D.) for natural menopause; complete relief.

CASE 39. Miss M. P. Ovarian residue (H. W. & D.) for hot flushes following hysterectomy for large adherent twisted pedicle cyst of ovary, and multiple fibroids. Improved.

CASE 40. Mrs. F. T. P. Ovarian residue (H. W. & D.) for menopause symptoms following radium. Almost complete relief.

CASE 41. Mrs. M. C. Ovarian extract (H. W. & D.) for hot flushes following hysterectomy for chronic pelvic inflammation, Immediate improvement.

AMENORRHŒA, DELAYED AND SCANTY MENSES

CASE 1. Mrs. G. A. K., age 33. Ovarian residue (P. D.) for amenorrhœa following lactation. No results.

CASE 2. Miss G. M., age 24. Normal uterus. Functional amenorrhœa. No results from corpus luteum. Ovarian residue (P. D.) and (H. W. & D.) followed by rather slight menstrual flow.

CASE 3. Mrs. M. P. M., age 21. Scanty menses and sterility. Undeveloped uterus. Ovarian residue, corpus luteum, and ovarian extract given, combined with electricity. Three unsuccessful attempts at artificial impregnation. Gradual improvement in catamenia, and increase in size of uterus, followed by natural impregnation and normal delivery. Effect of ovarian treatment problematic in this case.

CASE 4. Miss D. O. Ovarian residue (H. W. & D.) for functional amenorrhœa. Pain in lower back and lower abdomen, continued sleeplessness. No effect on amenorrhœa at first. Greatly improved constitutional symptoms. Marked tonic effect. Ovarian residue (H. W. & D.) alternated with corpus luteum (H. W. & D.) produced same effect. Slight menstrual flow after five months' treatment. Later report: "Feels fine while taking medicine." Last report: "Has had normal period."

CASE 5. Mrs. R. R. R., age 32. Uterus undeveloped, long continued amenorrhœa. No effect from ovarian residue combined with electricity. Heterotransplantation in the cervix followed by one normal period. Continued treatment with ovarian residue (P. D.) no effect.

CASE 6. Miss F. S., age 19. Ovarian residue (P. D.). Delayed menses with general feeling of discomfort. Immediate and continued improvement.

CASE 7. Mrs. N. S., age 20. Uterus undeveloped, second degree retroversion. Ovarian residue (P. D.) for continued amenorrhœa combined with thyroid extract. Marked constitutional improvement, no relief of amenorrhœa.

CASE 8. Miss A. W., age 23. Ovarian residue (P. D.) for amenorrhœa following radium treatment for long-continued menorrhagia. Corpus luteum, ovarian residue, and ovarian extract, given for many months when catamenia was re-established. The effect of ovarian treatment in this case is problematic.

CASE 9. Miss E. W., age 22. Uterus normal. Complete functional amenorrhœa. Two months' treatment of ovarian residue (P. D.) followed by normal period which was the first catamenial flow that the patient ever had. Continued treatment.

CASE 10. Mrs. A. F. W., age 26. Functional amenorrhœa. Ovarian residue (P. D.) followed by normal period. One report.

CASE 11. Mrs. F. C. N., age 30. Functional amenorrhœa. No effect from ovarian residue (P. D.) corpus luteum (H. W. & D.) followed by normal period. No later report.

CASE 12. Miss G. M. M., age 28. Functional amenorrhœa, dullness, apathy. Ovarian residue (P. D.) combined with thyroid extract. Greatly improved in general condition. Disappearance of dullness, no relief of amenorrhœa.

CASE 13. Miss H. G. E., age 17. Functional amenorrhœa, ovarian residue (P. D.) followed by normal flow, one report.

CASE 14. Miss C. E. P., age 36. Amenorrhœa following curettement for menorrhagia. After several months' treatment with ovarian residue (H. W. & D.) normal periods re-established seven months after curettement. During this time patient had hot flushes which were relieved by the ovarian residue treatment. Effect of ovarian residue on amenorrhœa in this case problematic.

CASE 15. Miss M. W., age 32. Delayed and scanty menses, adiposity, dullness, apathy. Ovarian residue (P. D.). Catamenia at the end of nine weeks with great improvement in general health, relief from apathy. Treatment continued alternated with corpus luteum (H. W. & D.). Nine months after first treatment the patient reports that she is having regular normal periods and is in good health.

CASE 16. Miss M. M., age 18. Also report under dysmenorrhœa. Long continued treatment with extract of whole ovary and ovarian residue (P. D.) re-established menstrual rhythm. At the end of four years patient states that she is dependent on ovarian treatment for regularity of menses.

CASE 17. Miss R. P., age 20. Examination negative. Ovarian residue (H. W. & D.) for delayed menses. Report: "Period came on after taking pills for 2½ days, and was normal in every way."

CASE 18. Mrs. K. P., age 24. Ovarian residue (P. D.) for scanty menses. Increased to normal.

CASE 19. Mrs. C. D. S., age 26. Ovarian residue (P. D.) given for scanty catamenia following radium for menorrhagia. Normal periods re-established.

CASE 20. Miss A. N., age 28. Ovarian residue (P. D.) for functional amenorrhœa. No results. Periods re-established after the use of Mixed Gland No. 2 B. & W.

CASE 21. Mrs. O. J., age 31. Ovarian residue (P. D.) for scanty menstruation, treatment re-established normal periods, "acted like a tonic." Some indigestion from capsules, due probably to lack of freshness.

CASE 22. Mrs. C. M. Y., age 30. Delayed and scanty catamenia. After taking ovarian residue (H. W. & D.) the patient menstruated for the first time in four years. Excellent constitutional effect.

CASE 23. Mrs. S. P. W., age 40. Ovarian residue (H. W. & D.) for delayed catamenia. Nausea and weakness at catamenia. The patient reports marked improvement in all symptoms.

CASE 24. Miss A. S., age 31. Ovarian residue (H. W. & D.) for prolonged interruption of menses. Normal menses re-established.

DYSMENORRHŒA

CASE 1. Miss B. B., age 26. Operation for retroversion-flexion, did not relieve symptoms, neurotic. Ovarian residue (P. D.) for dysmenorrhœa. Report: "Did not help me. Of course I only used one bottle and feel that perhaps I did not give them a fair trial."

CASE 2. Miss M. N., age 18. Not relieved by operation for retroversion. Ovarian residue (H. W. & D.). Report: "Greatly benefited while taking them." Symptoms returned as bad as ever when tablets gave out.

CASE 3. Mrs. W. E. B., age 27. No relief from operation for anteflexion with retrocession. Ovarian residue (P. D.). Report: "Very beneficial." Last report states that dysmenorrhœa is greatly relieved when taking ovarian residue before period. Dysmenorrhœa recurs when medicine is omitted.

CASE 4. Miss M. B., age 19. Uterus normal, small goiter. Ovarian residue (P. D.) for dysmenorrhœa and clotting. Report by telephone: Both conditions improved.

CASE 5. Miss H. C., age 23. Pelvic examination negative. Ovarian residue (P. D.) for dysmenorrhœa and headache. Complete relief at first, effect of treatment less marked in last report.

CASE 6. Mrs. R. A. D., age 32. Uterus normal. Ovarian residue (P. D.) for dysmenorrhœa and clotting. Immediate improvement of both symptoms. Last report: "Have never in my life had such easy menstrual periods. Clots much less than before treatment."

CASE 7. Mrs. A. J. E., age 31. Slight retroflexion and prolapse. Ovarian residue (H. W. & D.) for dysmenorrhœa; scanty menstruation with headaches. One report: Some improvement.

CASE 8. Miss O. E., age 27. Retroversion-flexion. Dysmenorrhœa not relieved by operation. Ovarian residue (H. W. & D.). One report: "Only took the pills two days before I started to flow. Pain was less on first day which is always my hardest day."

CASE 9. Mrs. I. F., age 30. Anteflexion. Dysmenorrhœa and sterility. Corpus luteum (H. W. & D.) gave no relief. Treatment changed to ovarian residue (P. D.). Report from letter: "Almost complete relief from dysmenorrhœa, flow scanty."

CASE 10. Miss L. F., age 15. Anteflexion, small intramural fibroid. Ovarian residue (P. D.). First report: "There has been a gain, but the periods are apt to vary." Later report: "Pain at period gradually growing less."

CASE 11. Miss M. D., age 27. Uterus normal. Dysmenorrhœa not relieved by dilatation. Ovarian residue (H. W. & D.) for dysmenorrhœa. Report by letter: "Pain less since taking pills."

CASE 12. Miss S. W. G., age 33. Chronic pelvic inflammation, small intramural fibroid. Marked neurotic. Ovarian residue (P. D.) for dysmenorrhœa, not improved. Later hysterectomy.

CASE 13. Miss M. G., age 21. Anteflexion. Ovarian residue (P. D.) for dysmenorrhœa and scanty catamenia. Immediate improvement of dysmenorrhœa. Later increase of flow. Tablets acted like a tonic. Numerous satisfactory reports.

CASE 14. Miss R. G., age 37. Slight anteflexion. Slight improvement with extract of the whole ovary. Changed to ovarian residue (P. D.). Marked improvement. Report by letter: "Pain greatly improved by last medicine."

CASE 15. Miss F. B. H., age 25. Long narrow cervix. Ovarian residue (P. D.) for scanty, painful catamenia. Report by letter, slight improvement.

CASE 16. Miss E. H., age 44. Myomectomy did not relieve dysmenorrhœa. Ovarian residue (H. W. & D.). Marked improvement.

CASE 17. Miss M. M. age 18. Undeveloped uterus. Catamenia regulated by ovarian extract. Dysmenorrhœa also relieved. Change to ovarian residue produced same satisfactory effect. Omission of ovarian treatment caused recurrence of symptoms. Treatment continued over period of four years. This is a good case to prove the physiological effect of ovarian therapy.

CASE 18. Miss A. M. W., age 27. Operation for retroversion did not relieve dysmenorrhœa. Ovarian residue (P. D.). Report: "I am sure it helped me because menstruation has been much less painful than usual."

CASE 19. Miss B. S. Pelvic examination negative. Ovarian residue (H. W. & D.) for dysmenorrhœa. Immediate relief. Treatment discontinued, symptoms recurred. Treatment continued using both (P. D.) and (H. W. & D.) preparations. Relief of nausea and dysmenorrhœa.

CASE 20. Miss C. G. P., age 21. Anteflexion and retrocession. Ovarian residue (H. W. & D.). Only one report: No relief.

CASE 21. Miss A. P., age 41. Normal uterus. Ovarian residue (P. D.) for irregular and difficult catamenia. Many favorable reports. Last report: "Repeated magical effect."

CASE 22. Miss I. E., age 23. Previous operation multiple myomectomy. Ovarian residue (P. D.) for premenstrual pain, no relief.

CASE 23. Mrs. A. C., age 35. Normal uterus. Ovarian residue (P. D.) for menstrual headache, general depression. One report: A brilliant improvement.

CASE 24. Mrs. H. P., age 31. Operation for retroversion relieved intermenstrual pain only temporarily. Ovarian extract given for recurrence of pain. Temporary relief. Ovarian residue (P. D.) given; greater relief than from ovarian extract.

CASE 25. Mrs. E. W. C., age 35. Dysmenorrhœa, headache, and clotting. Ovarian residue (P. D.) and (H. W. & D.). Treatment continued over considerable period with marked increasing improvement.

CASE 26. Mrs. I. P., age 24. Dysmenorrhœa and delayed menses. Treatment followed by normal period without pain. One report.

CASE 27. Mrs. C. F. M., age 38. Premenstrual discomfort, scanty, catamenia with sleeplessness, hot flushes, nervousness. All the symptoms were greatly improved by ovarian extract (P. D.).

CASE 28. Miss E. D. Headaches at catamenia. Report: "Wonderful result from pills."

CASE 29. Ovarian residue. Mrs. H. H. R. Dysmenorrhœa and nervous symptoms. Used ovarian residue (P. D.) for two years with general benefit.

AGE DISTRIBUTION AND AGE INCIDENCE IN 500 CASES OF CANCER OF THE UTERUS[1]

By REUBEN PETERSON, M.D., F.A.C.S., Ann Arbor, Michigan

INTEREST in the age incidence of carcinoma of the uterus was aroused by a recent case of this disease observed in the Gynecologic Clinic of the University Hospital.

A young married woman, Case No. 9916, 21 years old, June 15, 1918, entered the Hospital November 19, 1918. Up to 6 months prior to admission her periods were normal and painless. During 6 months the periods were more frequent and increased in amount and she was greatly distressed by a foul vaginal discharge. For 3 months prior to her entrance to the hospital she had had great pain in the pelvis and back and had lost 25 pounds in weight.

Vaginal examination showed a profuse, bloody, foul discharge and far advanced carcinoma of the cervix, the latter being fixed in the pelvis and deeply excavated. The diagnosis of inoperable squamous cell carcinoma of the cervix was subsequently confirmed by microscopic examination in the University of Michigan Pathological Laboratory. The patient left the hospital without treatment or operation.

With a view of determining the age incidence of cancer of the uterus in a large series of cases, material was collected from the following sources:

1. Cases of uterine cancer from 1901 to 1918, Gynecologic Clinic, Universityof Michigan Hospital	298
2. Cases of uterine cancer, 1902 to 1918, Private Clinic	55
3. Cases of uterine cancer from other sources, 1895 to 1918. Pathological Laboratory, University of Michigan	147
Total	500

The cases were not selected but were included in the list as they occurred chronologically up to 500 cases, a number large enough to allow of accurate conclusions being drawn.

Each of the 500 cases of uterine carcinoma had had the diagnosis confirmed microscopically in the University of Michigan Pathological Laboratory by its director, an acknowledged authority, whose final judgment can not be questioned.

Many other cases admitted to the University and private clinics during these years were undoubtedly uterine cancer, the diagnosis being so easily made by palpation and the appearance of the growth that no tissue was sent to the pathologist for confirmatory diagnosis. In many cases where microscopical diagnosis was considered unnecessary, the subsequent death of the patient was recorded in the notes, leaving absolutely no doubt as to the correctness of the clinical diagnosis. However, so abundant was the material that it was thought best not to include such cases in the list to be analyzed.

The investigation may be considered supplementary to the admirable work along the same line which has been conducted by Doctors A. S. Warthin and Carl V. Weller of the Department of Pathology for whose generous aid and co-operation I am greatly indebted.

It seems necessary to state again here what has been emphasized by these two authors regarding the material at the Pathological Laboratory, namely, that it is almost entirely derived from the State of Michigan and represents the average population of the State, since the University Hospitals are not charity hospitals in the sense that they are filled with non-paying pauper patients. In the same way the 55 private cases and the 147 cases "from other sources" may be said to represent the same average population.

For the purpose of this paper, at least, the words distribution and incidence as applied to the ages of the cancer cases will be used in a different sense. Age distribution will refer to the number of cases in the series of 500 which is found at each age period, while age incidence will refer to the ratios at any given age period, obtained by considering the percentage of carcinoma at that age period in reference to the percentage of the population at the same period.

[1] Read before the American Gynecological Society, Atlantic City, June, 1919.

Age distribution and age incidence in the 500 cases have been considered under the following headings chosen for either anatomical or microscopical reasons:

1. Carcinoma of the uterus;
2. Carcinoma of the cervix;
3. Carcinoma of the fundus;
4. Squamous cell carcinoma of the cervix;
5. Adenocarcinoma of the cervix.

In all tables and charts the ages have been divided into five-year periods, the first multiple of five being inclusive. For example, the age period 40 to 45 includes all cancer cases whose ages are 40, 41, 42, 43, 44. Cases of age 45, however, are placed in the succeeding period.

This arrangement of the age periods in multiples of five was deliberately chosen in order to make it easier for the average person to retain the figures in mind, a somewhat hopeless task where another arrangement is chosen.

The United States Census report of 1900 was chosen in preference to the 1910 report in figuring the percentage of total female population living at the different age periods for the reason that the figures for the five-age periods above the age of 65 were not given in the most recent report. However, as explained by Doctor Weller in his article, the possible error is negligible since the variations in age distribution over a few years are very slight.

1. AGE DISTRIBUTION IN CARCINOMA OF THE UTERUS

Table I shows the age distribution of the 500 cases of uterine cancer.

The age distribution of these cases is also well shown graphically in Chart 1. Starting with 7 cases between the ages 20 to 25 the curve rises rapidly until it reaches its maximum at the age period 40 to 45. This agrees with our former ideas regarding the age when cancer is most to be feared; at about the menopause. The line then sharply falls only to rise again at the 50 to 55 age period. A slight lowering at the age period 55 to 60 is followed by a rapid decline up to the age 85.

It must be borne in mind that this chart represents the age distribution of both cervical and fundal carcinoma and must be studied in connection with Chart 2 to explain why the curve remains so high until the period 55 to 60. As will be brought out later the series contains a rather large proportion of fundal carcinoma cases (94) the maximum age period of which is between 55 and 60. This keeps the curve up in Chart 1 until the sudden drop at the age period from 60 to 65.

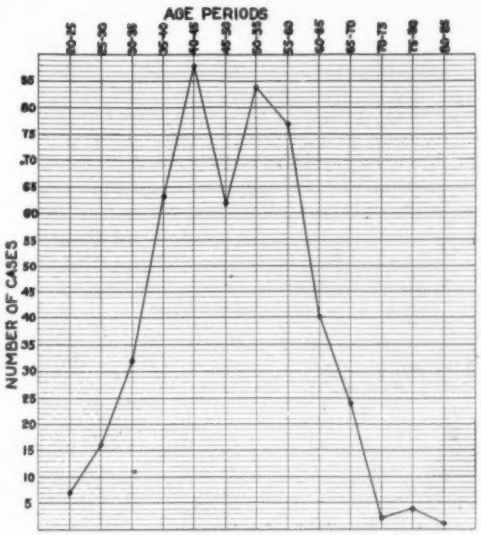

Chart 1. Age distribution in 500 cases of carcinoma of the uterus.

A study of Table I shows that 82 per cent of uterine carcinoma occurs between the ages of 35 and 65. This corresponds very nearly to the figures of Wilson whose analysis

TABLE I.—AGE DISTRIBUTION IN CARCINOMA OF THE UTERUS

Ages	Number of Cases	Percentage
20 to 25	7	1.4
25 to 30	16	3.2
30 to 35	32	6.4
35 to 40	63	12.6
40 to 45	88	17.6
45 to 50	62	12.4
50 to 55	84	16.8
55 to 60	77	15.4
60 to 65	40	8.0
65 to 70	24	5.2
70 to 75	2	0.4
75 to 80	4	0.8
80 to 85	1	0.2
	500	

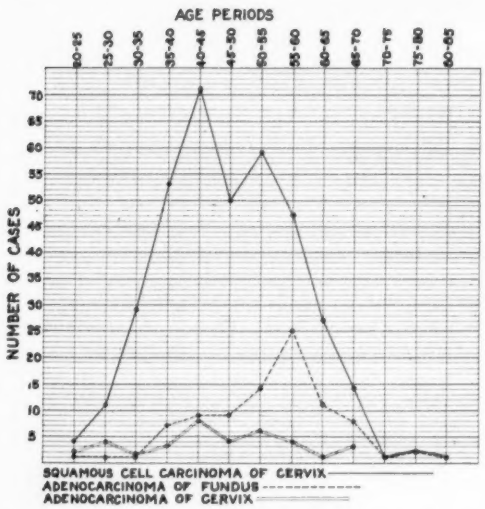

Chart 2. Age distribution in squamous cell carcinoma of the cervix, adenocarcinoma of the fundus, adenocarcinoma of the cervix.

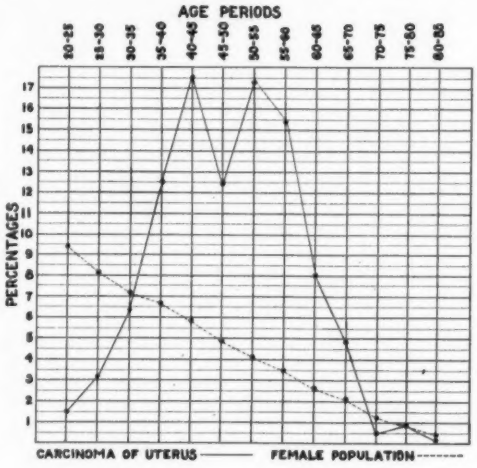

Chart 3. Percentage of female population living at different age periods and age distribution in 500 cases of carcinoma of the uterus.

of the ages of 403 patients with uterine cancer shows 86 per cent between the ages mentioned.

Naturally a distinction is made between carcinoma of the cervix and fundus since it has been well established that adenocarcinoma of the fundus appears at a later age period than does carcinoma of the cervix. Hence the findings of other writers will be deferred until carcinoma of the fundus is considered.

Out of 500 cases there were 7 cases of carcinoma between the ages of 20 and 25. Of these 4 were squamous cell of the cervix, 2 adenocarcinoma of the cervix, and 1 adenocarcinoma of the fundus. If 1.4 per cent of carcinoma of the uterus occurs in young women between the ages mentioned, our ideas regarding the immunity of the young female for carcinoma must be radically changed.

Gayraud found but 3 cases of cancer of the uterus in the first twenty years of life. It is questionable if these cases (Eckhardt, Ganghofer, Tchopp) are not in reality teratoma or sarcoma and not carcinoma. Adams' case of carcinoma in a child two and one-half years old was so reported upon by the pathology committee of the Royal Society of Medicine.

Cragin's case of squamous cell carcinoma in a single woman of 18 and Wells' case of adenocarcinoma at the level of the internal os in a young married woman of 18 would seem to be genuine cases. The same may be said of de Rouville's case of squamous cell carcinoma in a young unmarried girl of 18.

Webster quotes Gusserow's statistics showing two cases of uterine carcinoma in women below the age of 20 in 3471 cases. Hoffmeier in 860 cases did not have a single case of uterine carcinoma under 20 years of age. Koblanck's statistics in Veit's *Handbuch der Gynaekologie* show that there were only two cases of uterine carcinoma in women under 20 in 6354 cases of carcinoma of the uterus.

From this evidence it may be concluded that uterine carcinoma below the age of 20 is exceedingly rare, that it is infrequent, but that it does occur in an appreciable percentage of cases between 20 and 25.

The age of the youngest patient in the series of 500 cases of uterine carcinoma was 21 while the age of the oldest was 82. The average age for the entire series was 47.5 years. Findley reports a case of cauliflower

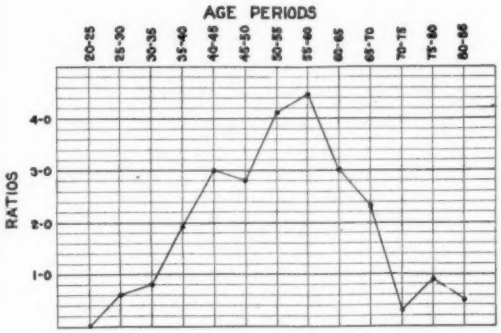

Chart 4. Age incidence in carcinoma of the uterus.

cancer unconfirmed by microscopical examination in an old lady of 93.

2. AGE DISTRIBUTION IN CARCINOMA OF THE CERVIX

It has been found convenient to divide carcinoma of the uterus into two classes as it affects the cervix or fundus, since the natural history of the disease in the two locations shows marked differences.

TABLE II.—AGE DISTRIBUTION IN CARCINOMA OF THE CERVIX

Ages	Number of Cases	Percentage
20 to 25	6	1.4
25 to 30	15	3.6
30 to 35	31	7.6
35 to 40	56	13.7
40 to 45	79	19.4
45 to 50	53	13.0
50 to 55	65	16.0
55 to 60	52	12.8
60 to 65	29	7.1
65 to 70	16	3.4
70 to 75	1	.2
75 to 80	2	.4
80 to 85	1	.2
	406	

In this table will be found cases of both squamous cell and adenocarcinoma of the cervix. It will be noted that the cervix was the seat of this disease in 6 out of the 7 cases occurring between the ages 20 to 25 and the fundus was affected in only one case at these ages.

The youngest patient in the 406 cases where the cervix was affected by carcinoma was 21 and the oldest 82, the same as in the preceding group.

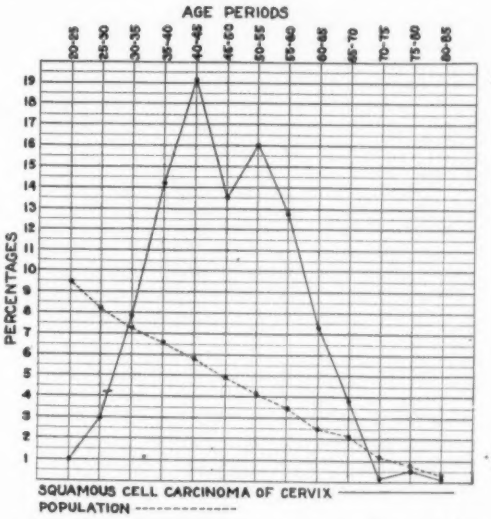

Chart 5. Percentage of the female population living at different age periods and squamous cell carcinoma of the cervix.

The maximum number of cases in this group will be found between the ages of 40 and 45, as would be expected since the greater proportion of the 406 cases of cervical cancer are of the squamous cell type.

The average age of the 406 cases of cervical cancer was lower by two years than in the complete group of 500 cases being 45.5 as compared with 47.5.

3. AGE DISTRIBUTION IN CARCINOMA OF THE FUNDUS

In the 500 cases of uterine carcinoma, the fundus was the seat of the disease in an unusually large percentage of cases, 94 out of 500, or 18.8 per cent. This may possibly be explained by the fact that every suspicious case in both the public and private clinics is subjected to a diagnostic curettage and that all curettings undergo routine examination in the Pathological Laboratory. In this way not only are many suspicious or borderline cases proved microscopically to be carcinoma but a considerable number of unsuspected cases is returned with diagnosis of adenocarcinoma of the fundus.

A study of Table III and Chart 2 shows that the distribution of carcinoma where the

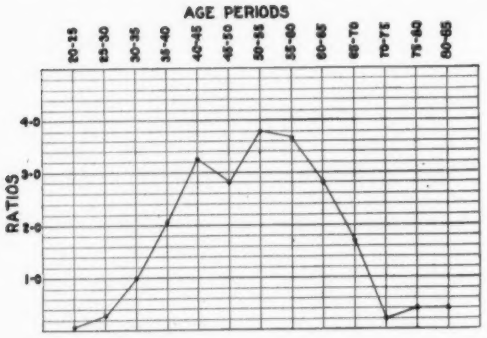

Chart 6. Age incidence in squamous cell carcinoma of e cervix.

TABLE III.—AGE DISTRIBUTION IN CARCINOMA OF THE FUNDUS

Ages	Number of Cases	Percentage
20 to 25	1	1.06
25 to 30	1	1.06
30 to 35	1	1.06
35 to 40	7	7.4
40 to 45	9	9.5
45 to 50	9	9.5
50 to 55	19	20.2
55 to 60	25	26.5
60 to 65	11	11.7
65 to 70	8	8.5
70 to 75	1	1.06
75 to 80	2	2.1
	94	

fundus alone is involved reaches its maximum at the age period 55 to 60, 15 years later than in squamous cell carcinoma of the cervix which as already stated, is at the age period 40 to 45. Wilson in his series of cases found it 5 years subsequent to the maximum distribution of squamous cell carcinoma (45 to 55). Levin in an analysis of 613 cases of cancer of the uterus collected from the foremost New York hospitals found the distribution of cervical cancer greatest during the age period 45 to 60, the same being the case with carcinoma of the body. However, during these periods cervical cancer was only 49 per cent while fundal carcinoma was 55 per cent. These statistics are open to the objection which can be raised against many of this nature that the diagnoses apparently have not been checked up by careful microscopical examination. Koblanck's analysis of 6354 cases of uterine cancer

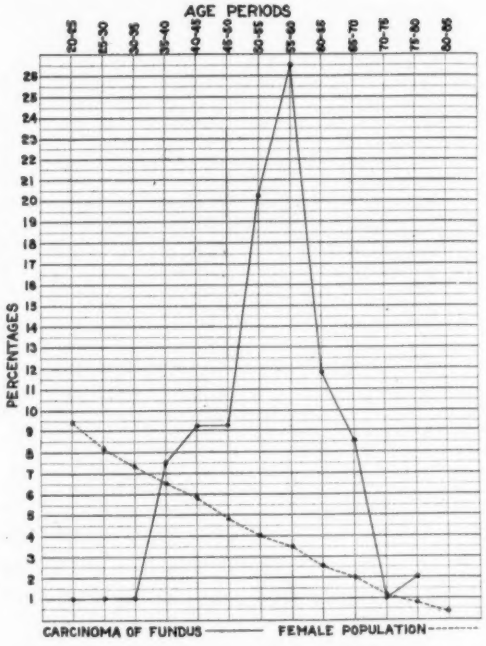

Chart 7. Percentage of female population living at different age periods and age distribution in carcinoma of the fundus.

shows the greatest age distribution in cancer of the cervix between ages 40 and 49 while the maximum distribution in carcinoma of the fundus is ten years later or between 50 and 59.

In the 15 years preceding age 35 there were only 3 cases of carcinoma of the fundus showing that in this location it is not a disease of early life. This observation is borne out by other statistics. Young and Williams found 3 cases out of 17 of fundal carcinoma under 40 years of age. Anderson and Platt out of 35 cases of carcinoma of the fundus found none under 40 years of age. Wilson in 56 cases of fundal carcinoma in his series found none under 45.

As previously stated there were 94 cases of adenocarcinoma of the fundus in the 500 cases, or 18.8 per cent. Anderson and Platt found carcinoma of the fundus in about 15 per cent of their 253 cases of uterine carcinoma. The percentage is very low in Koblanck's statistics being only 4.4 per cent

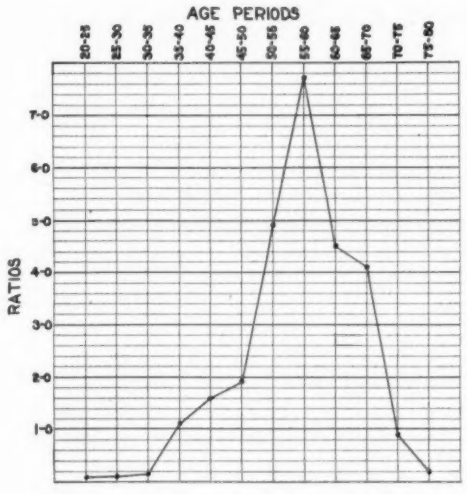

Chart 8. Age incidence in carcinoma of the fundus.

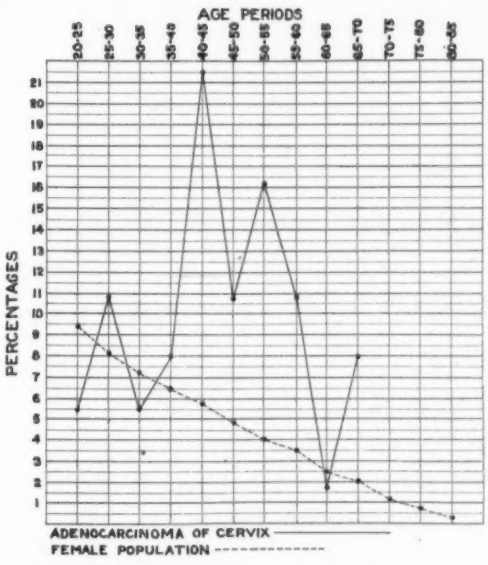

Chart 9. Percentage of female population living at different age periods and adenocarcinoma of the cervix.

in 6354 cases. Kutner's (Wisselink) percentage was 9.4, Hofmeier (Steinbach) 11, Hammer 13, Olshausen (Wilkens) 12 and Wilson 11. From this it is fair to assume that in a given series of cases of uterine cancer, from 10 to 15 per cent will prove to be located in the fundus.

In the 94 cases the youngest patient was aged 22 and the oldest 75.

The average age of the 94 cases of adenocarcinoma of the fundus was 54.1 years, exceeding by nearly 10 years the average age of the 406 cases of cervical cancer (45.5).

4. AGE DISTRIBUTION IN SQUAMOUS CELL CARCINOMA OF CERVIX

As would be expected, since it has long been recognized that this form of uterine cancer is most frequently met with, the cases of squamous cell carcinoma of the cervix formed the largest group in the series, there being 369 cases in all.

Table IV should be studied in connection with Chart 2 where the distribution of the cases of squamous cell carcinoma of the cervix is shown graphically. In Chart 2 it will be noted that the curve rises much more abruptly than with the two other varieties of carcinoma, adenocarcinoma of the fundus and cervix, and reaches its maximum at the age period 40 to 45 with 71 cases. After a slight rise at age period 50 to 55 the descent is quite rapid.

TABLE IV.—AGE DISTRIBUTION IN SQUAMOUS CELL CARCINOMA OF CERVIX

Ages	Number of Cases	Percentage
20 to 25	4	1.08
25 to 30	11	2.9
30 to 35	29	7.8
35 to 40	53	14.3
40 to 45	71	19.2
45 to 50	50	13.5
50 to 55	59	15.9
55 to 60	47	12.7
60 to 65	27	7.3
65 to 70	14	3.7
70 to 75	1	.27
75 to 80	2	.54
80 to 85	1	.27
	369	

In contradistinction to carcinoma of the fundus (Table III), there is quite a proportion of cases in early life, 97, or 23.5 per cent being under the age of 40. Again 180 or practically 50 per cent of the 369 cases occur from 40 to 55 the ages during which the menopause is most frequently met with.

The youngest patient with squamous cell carcinoma in this series was 21, the oldest 82.

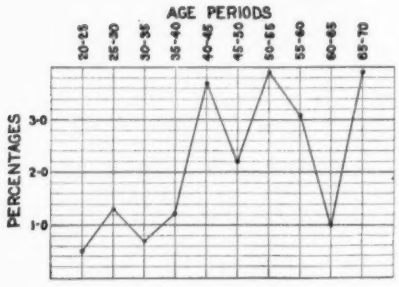

Chart 10. Age incidence in adenocarcinoma of the cervix.

The average age of the 369 cases was 46.6 years, one year older than where the two varieties of cervical carcinoma are considered together and 9 years less than the average for carcinoma of the fundus.

5. AGE DISTRIBUTION IN ADENOCARCINOMA OF THE CERVIX

This variety of uterine cancer is much more rare than either squamous cell carcinoma of the cervix or adenocarcinoma of the fundus. For this reason the graphic curve is subject to greater fluctuation (Chart 2), and the age distribution in a larger series of cases than 37 might give different results.

TABLE V.—AGE DISTRIBUTION IN ADENOCARCINOMA OF CERVIX

Ages	Number of Cases	Percentage
20 to 25	2	5.4
25 to 30	4	10.8
30 to 35	2	5.4
35 to 40	3	8.1
40 to 45	8	21.6
45 to 50	4	10.8
50 to 55	6	16.2
55 to 60	4	10.8
60 to 65	1	2.7
65 to 70	3	8.1
	37	

The greatest number of cases of adenocarcinoma of the cervix is at the age period 40 to 45 which corresponds to the findings in carcinoma of the uterus and squamous cell carcinoma of the cervix (Chart 2).

Other facts to be noted in this table are that this variety of cancer, unlike the same variety in the fundus, is found fairly frequently in the early years of life. Between 20 and 40 years of age, there were 11 cases of adenocarcinoma of the cervix or 30 per cent of the 37 cases, a greater percentage than was found for squamous cell carcinoma of the cervix for the same period.

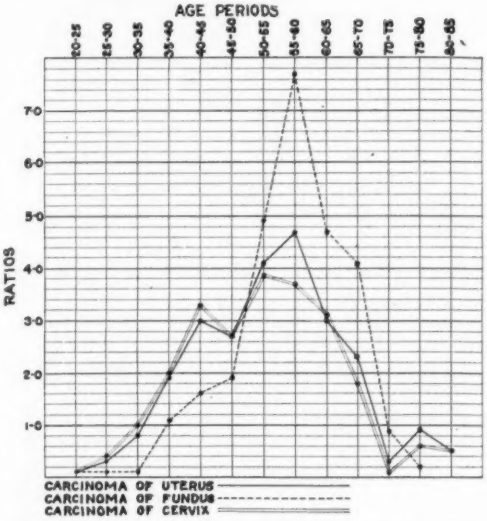

Chart 11. Age incidence in carcinoma of the uterus, fundus and cervix.

Again the cases in this group are more evenly divided after 40 years of age up to 70 than in the other varieties of cancer. There were no cases after the age of 70 which again differs from the squamous cell variety of cervical cancer and from adenocarcinoma of the fundus. The youngest patient was 23 years of age, the oldest 67. The average age of the 37 cases was 44.7 years, below the average for carcinoma of the uterus as a whole, squamous cell carcinoma of the cervix and carcinoma of the fundus.

Up to this point the 500 cases have been studied in reference to different age periods. It now becomes necessary to study them in connection with the total living female population at given periods, if correct interpretations are to be made regarding the age incidence of the series as a whole and its different varieties. With this end in view a series of charts has been made, so that the carcinoma incidence in the various groups may be graphically shown.

First, the percentage of the total female population during each age period and the percentage of the 500 carcinoma cases for each age period is graphically shown, followed by a second graphic chart in which the carcinoma incidence at the different age periods is arrived at by dividing the percentage of carcinoma for different age periods by the percentage of the population at the same age periods. This last, as shown by Doctor Weller in his article, may be represented as follows:

Ratio for age period

$$N = \frac{\text{percentage of carcinoma for age period N}}{\text{percentage of population for age period N}}$$

Carcinoma of uterus. A study of Chart 3 (percentage of female population and of carcinoma of uterus) and Chart 4 (age incidence in carcinoma of uterus) is very interesting. In Chart 3 the carcinoma curve lies below the population curve up to the age of 35. The carcinoma curve then rises rapidly and reaches its highest point at the age period 40 to 45. After some variations between age periods 40 to 45 and 55 to 60 the curve descends rapidly to cross the population line again between the age periods 65 to 70 and 70 to 75.

The true carcinoma incidence at different ages arrived at by the series of ratios, as previously described, is shown in Chart 4. Here the apex of the curve is seen to be at the age period 55 to 60 which represents the greatest carcinoma incidence. After this point is reached the curve descends rapidly to age period 70 to 75, rising slightly at the next two five year periods.

Squamous cell carinoma of the cervix. In Chart 5 the carcinoma curve crosses the population curve before the age period 30 to 35 and reaches the maximum at age period 40 to 45. However, by the ratio computation the greatest carcinoma incidence is shown to be 10 years later, or at age period 50 to 55. After this the curve rapidly falls up to the age period 70 to 75.

Adenocarcinoma of fundus. In Chart 7 the carcinoma curve crosses the population curve at nearly the 35 to 40 age period, the apex of the curve being at age period 55 to 60. This corresponds to what may be called the true carcinoma incidence, which is greatest at the same age period, as shown in Chart 8. Again in this chart is shown the sudden drop in the age incidence after the apex of the curve has been reached.

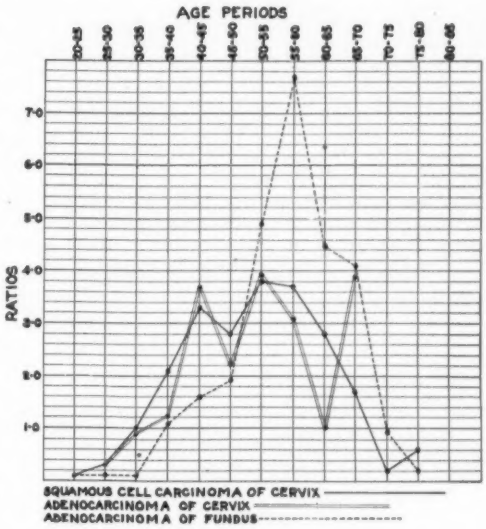

Chart 12. Age incidence in squamous cell and adenocarcinoma of the cervix and adenocarcinoma of the fundus.

Adenocarcinoma of cervix. As pointed out previously, the variations in the carcinoma curve as shown in Chart 9 are probably due to the small number of cases, for the carcinoma and population curves cross and recross, which did not happen with the other charts when a greater number of cases was considered. However, the two charts of this variety of cancer are reproduced to show this fact and to show also that the carcinoma incidence is greatest at age period 50 to 55. which corresponds to the maximum carcinoma incidence in squamous cell carcinoma of the cervix.

Age incidence in carcinoma of uterus, fundus and cervix. The age incidence of carcinoma of the uterus as a whole and carcinoma situated in the fundus and cervix is shown graphically in Chart 11.

In carcinoma of the uterus taken as a whole and adenocarcinoma of the fundus the greatest carcinoma incidence is at age period 55 to 60, whereas in carcinoma of the

cervix, it is at age period 50 to 55 equaling what was found for these two varieties in other parts.

The age incidence in the three varieties of uterine cancer is shown in Chart 12.

For the sake of convenience and ready reference the age periods of greatest carcinoma incidence in the different divisions of the subject have been arranged in Table VI.

TABLE VI.—AGE PERIODS OF GREATEST CARCINOMA INCIDENCE

Carcinoma of cervix	50 to 55
Squamous cell carcinoma of cervix	50 to 55
Adenocarcinoma of cervix	50 to 55
Uterine carcinoma	55 to 60
Adenocarcinoma of fundus	55 to 60

SUMMARY

1. The maximum age distribution in 500 cases of cancer of the uterus is at the age period 40 to 45.

2. Between the ages 35 and 65 occurs 82 per cent of uterine cancer.

3. The young female is not immune to cancer, since 7 of 500 cases, or 1.4 per cent, occurred between the ages of 20 and 25.

4. Uterine carcinoma below the age of 20 is exceedingly rare but it does occur in an appreciable percentage of cases between 20 and 25.

5. The cervix was the seat of the disease in 6 out of 7 cases occurring between the ages of 20 and 25.

6. The maximum number of cases of carcinoma of the cervix is to be found in age period 40 to 45.

7. In the present series of cases carcinoma of the fundus was found in an unusually large percentage of cases, 94 out of 500 or 18.8 per cent.

8. The maximum number of cases of adenocarcinoma of the fundus is to be found between 55 and 60, fifteen years later than in squamous cell carcinoma of the cervix, which is 40 to 45.

9. Adenocarcinoma of the fundus is not a disease of early life, there being in the present series only 3 cases out of 94 below the age of 35.

10. From the analysis of this series and from the statistics of other writers it is fair to assume that from 10 to 15 per cent of uterine carcinoma is located in the fundus.

11. A large proportion of the 500 cases of uterine cancer was squamous cell carcinoma of the cervix, 369 in all.

12. In contradistinction to carcinoma of the fundus 23.5 per cent of squamous cell carcinoma of the cervix is found in patients under 40.

13. Practically 50 per cent of the 369 cases of squamous cell carcinoma of the cervix occurred between the ages of 40 and 55.

14. Adenocarcinoma of the cervix is much more rare than the two other forms, 37 out of 500 cases.

15. The maximum number of cases occurs in age period 40 to 45.

16. Between 20 and 40 years of age there were 30 per cent of the 37 cases of adenocarcinoma of the cervix.

17. The age incidence of carcinoma of the uterus at different age periods is determined by the following:

Ratio for age period

$$N = \frac{\text{percentage of carcinoma for age period N}}{\text{percentage of population for age period N}}$$

18. The maximum age incidence for carcinoma of the uterus is at age period 55 to 60: it declines rapidly from this age period to the period 70 to 75.

19. The greatest age incidence for adenocarcinoma of the fundus is the same as that of cancer of the uterus as a whole, age period 55 to 60.

20. The highest carcinoma incidence in carcinoma located in the cervix, in squamous cell carcinoma of the cervix, and in adenocarcinoma of the cervix is at the age period 50 to 55.

21. After each age period of greatest carcinoma incidence is reached, there is a sharp decrease in incidence demonstrating the incorrectness of the statement that the age incidence of carcinoma increases with the age period.

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ELECTIVE CÆSAREAN SECTION [1]

By EDWARD P. DAVIS, A.M., M.D., F.A.C.S., Philadelphia

THE indications for cæsarean section have been so greatly enlarged, and the profession has now had so extensive an experience with this operation that it may be well to attempt to define, in a special group of cases, the indications for this procedure.

Elective cæsarean section without labor, at the time and under circumstances most advantageous for patient and operator, is an attractive field. For the patient it avoids the suffering and delay of parturition, the disturbance of rest and the uncertainty which is often so trying for the operator; it gives him the most favorable time and circumstances for the performance of the operation.

In one class of cases there may be no reasonable doubt as to the indication for elective cæsarean section. These are patients who have had several difficult labors terminated by the death of the children occurring at various intervals of gestation and under varying circumstances. In each case spontaneous labor has been attempted with failure and a difficult, and for the fœtus, fatal delivery through the vagina. Spontaneous labor in these patients has occurred at varying intervals, so that the question of prolonged pregnancy has not always arisen. Undoubtedly some of the pregnancies have terminated prematurely.

Under these circumstances the operator has the choice of three procedures: First, the placing of the mother upon restricted diet, with careful hygiene, with the hope that the fœtus may become proportionate to the shape and size of the birth canal and that successful spontaneous labor may result.

The second procedure would consist in the induction of labor at such a time as might seem most advantageous, but as previous spontaneous labors had occurred unsuccessfully at various periods of gestation this would indicate the uncertainty of inducing labor.

The third choice lies in promoting the nutrition of mother and child in the highest degree throughout pregnancy and at its termination, with or without the first signs of labor, performing elective section.

The advantages for this procedure are the vigorous condition of the child, an uninjured and unwearied mother and the relief from uncertainty and delay which difficult and unsuccessful labor entail.

If husband and wife elect sterilization under these circumstances shall the operator accede to their wish? This is a question difficult to answer, but we must concede to them the right to request such a procedure. On the other hand, if they have no living child, they must be urged to avoid sterilization until several children have been obtained by repeated section or some other successful method.

The phrase physiological incompetence for labor has been employed in discussing the indications for cæsarean section. We must believe that every condition in the human body has a definite physical cause, and that while macroscopically we may not be able to appreciate the condition of the tissues which produces a given result, yet microscopically physiological incompetence for labor is the result of certain definite conditions existing in the tissues. These cases are usually seen in ill developed, badly nourished and neurotic primiparæ, some of whom are considerably beyond the usual age of primiparous women. In many of these cases the shape, size, and contour of the pelvis are normal, and the pelvis may even be larger than the average. Some of these patients give a history of irregular or painful menstruation, some are overweight and show symptoms of derangement in the function of the glands of internal secretion.

The most characteristic phenomenon in these cases, after we take into account the evidences of malnutrition which develop during pregnancy, is the failure of the uterus to cause the child to descend and engage

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in the last weeks of gestation. Uterine contractions are so slight as to be unrecognizable. There is no effort to bring about the fitting of the fœtus into the birth canal, and there is not a sign of the development of labor. In many of these patients a pathological condition of the uterine muscle or nervous supply is present. While there may be nothing in the condition which can be recognized by ordinary examination, the actual inspection of the severed uterine muscle may show a condition of fibrosis which is at the bottom of the difficulty. These patients have no definite fibroid tumor of the uterus, but the uterine muscle is studded with small fibrous tumors whose presence prevents the efficient contraction of the uterus and thus renders impossible the development of normal labor.

For these patients the induction of labor would be of little if any service. The deficient uterus would not act properly under external interference, nor could drugs alter the efficiency of the diseased muscle. Artificial delivery becomes inevitable and if the interests of the child are to be considered, elective section is the operation of choice. May I illustrate this class of cases by an example?

A primipara about 40, inherited a condition of nervous and muscular inability. She passed through her pregnancy without incident, the fœtus being extraordinarily well nourished. In spite of the constant attention of a skillful nurse, she passed into a condition of apathy at the end of pregnancy which made it difficult to care for her. She was made to take regular exercise and her physical nutrition was good. The fœtus was in breech presentation, and as the time for labor came and went it was evident that artificial delivery must be practised. The pelvis was of average size and symmetrical. The child was unusually large and the mother failed utterly to produce the phenomena characteristic of prelabor conditions. Under these circumstances a consultation resulted in the choice of elective section. A vigorous male child was successfully delivered, mother and child making uninterrupted recovery. No macroscopic reason for the delay in the development of labor was found.

An unusually well developed primipara, aged 34, passed through a similar experience. Under the care of a skillful nurse she took regular and abundant exercise, followed strict hygienic precautions, but no sign of descent or of labor developed. At elective section the uterine muscle was found studded with small fibroids, none of which, fortunately, was directly in the line of the incision. The first operation was so successful that in the second pregnancy the patient requested section. At this operation the condition of the uterine muscle closely resembled that first seen, and but slight improvement had taken place. The second, like the first, operation was successful. There has been no subsequent pregnancy.

In some cases of repeated unsuccessful labor, or where the mother has a number of living children and yet is in ill health during the greater part of the time with some uterine condition, both parents may elect delivery by section, followed by sterilization, the operation to be done in such a manner as to cure the uterine condition. In many cases it is best to retain the function of the ovaries, and hence the operation consists of elective delivery by section, followed by the removal of the body of the uterus and fallopian tubes and the appendix. In one patient so treated menstruation has continued regularly, and without pain, from the uterine stump, the vaginal discharge being typical and normal.

The choice of elective section in primiparæ is sometimes difficult. This is especially true in cases of slightly contracted pelvis and in cases where the fœtus is unusually large, the position and presentation abnormal, and where there is reason to fear that the physiological development of the uterus is deficient. This may be illustrated as follows:

A young primipara, with pelvis symmetrical and of average size, was married to a well developed, athletic man. The head of the fœtus was at the pelvic brim, the back of the child toward the right. The later period of gestation passed without the development of descent or engagement. About two weeks followed with no essential change, excepting that the head of the child turned transversely across the pelvic brim when a parietal bone presented. The parents of the patient stated that she had always been a vigorous, healthy girl. Her general development was average.

Under these circumstances the induction of labor would have produced uterine contractions, but would not have altered the unfavorable position of the child whose descent and engagement were impossible in its vicious position. Induction of labor followed by version and extraction would have exposed the child to very considerable risk. To wait longer would have been irrational, for the head of the child would become harder and time would not alter its vicious position. Furthermore, the fact that labor

had not developed raised the suspicion that some unusual condition of the uterine muscle might be present. To complicate matters the husband of the patient, an officer in the Army, was absent in France. A consultation was called with the parents and the probable result of the induction of labor, waiting and elective section, was first proffered. Elective section was selected. At operation the uterine muscle was extraordinarily thinned and ill developed. A large male child was readily delivered, but some difficulty was experienced in causing the thin muscular wall of the uterus to contract properly. Under gauze packing and stimulation this was accomplished. Mother and child made uninterrupted recovery.

In primiparæ in whom labor does not develop, the pelvis being of average size, some abnormality connected with the fœtus must be suspected. Here one must be careful to detect the presence of a hydrocephalic or monster child. If such be present embryotomy would be indicated, but in the absence of such evidence disproportion or some abnormality connected with the child may be the cause of delay.

In a large, well developed primipara there were slight efforts at descent and engagement at the natural end of gestation. Labor failed to develop and after some time elective section was practised. When the uterus was opened an unusually long umbilical cord was so coiled about the child that its descent and engagement could only ha e been possible by the separation of the placenta or the rupture of the cord. There were no abnormal sounds over the uterus and it is hard to say how this condition could have been diagnosticated before the uterus was opened.

It is evident that the obstetrician takes great responsibility in advising elective cæsarean section. It is the practice of the writer in all cases where the lives of mother and child are not plainly endangered carefully to avoid urging operation upon any patient. The results of various procedures for mother and child obtained in his own experience and also in large numbers of cases reported by others are stated to those responsible for the patient's care. They must elect and the most that the physician can do is to give them facts, offering his own choice and opinion only if such are requested.

In the performance of elective section care must be taken to secure efficient drainage of the lochia. This, of course, is unnecessary where the body of the uterus is removed, but even then it is well to see that the cervical canal is sufficiently open to give exit to such fluid as may accumulate in the upper portion of the stump. Where hysterectomy is not done some operators content themselves with passing one or two fingers from above downward through the cervix when the uterus is emptied. Others pass a large sized solid dilator, while some dilate the cervix with the finger, pack the body of the uterus with iodoform gauze and bring the end of the gauze through the cervix into the vagina. In the experience of the writer this is the safest and most efficient procedure. The presence of the gauze acts as a stimulus to uterine contraction. The cervix dilates sufficiently to give free exit to retained material and the removal of the gauze forty-eight to sixty hours after the operation has so far not been painful or dangerous.

Recovery from elective section is often more speedy and complete than after a fatiguing and tedious labor. Morbidity is no greater than after any other operation of equal importance.

THE RELATION OF PREVENTIVE MEDICINE TO GYNECOLOGY [1]

By HENRY P. NEWMAN, A.M., M.D., F.A.C.S., San Diego, California

THE history of the progress of medical science is a record of battles against an enemy persistent as life itself. The struggle has not been to make material life everlasting by eliminating death, but, by striking ceaselessly against those errors of life which are the basis of disease, make living always more worth while. The common notion that the science of medicine, like the vulture, gloats and battens on the miseries of the body, is a sorry delusion. There should be better popular understanding of the activities of that science which has from the beginning held out strong and skillful hands to weakened humanity, guiding and supporting its blind and sometimes foolish steps, seeking, for highest reward, only the hope that some day its charge will be able to walk alone.

This, then, is the province of preventive medicine—to teach mankind to do without medical aid, except for such conditions as do not fall within the realm of preventable diseases. Unfortunately we are still far from this achievement when we take up the problem of gynecic disease. A percentage that can scarcely be reckoned is here due to entirely preventable causes and the aim of this specialty, in this post-war period when our great national and racial preoccupation is reconstruction, should be the identification and elimination of the cause of disease in women.

We may go at it with great thoroughness, dragging it back into the remote recesses of psychology and biology, or we may face it quite simply from the human standpoint, asking two questions: Why are women suffering these unnecessary afflictions? and, What shall we do to prevent them?

The case records of the gynecologist answer the first question, but here the answer comes too late. While developmental defects, faulty obstetrics, infections, are all causative factors, the time for the correction of these evils is past.

The answer to the second question, the remedy, is the concern of the entire medical profession today, and when it is faced with thoroughness of purpose there will be established that relation of preventive medicine to gynecology which is not only the concern of this specialty but of the entire people. Already the new current of democracy is turning in this direction and against the tide of unconditioned "medical freedom" so strongly urged by the advocates of various profitable cults and isms.

No enlarging on this theme could make clearer to you the menace of such freedom for the future, but, colleagues, the future is with *us*. Bolshevism in medicine will defeat itself as surely as this age will see its failure in politics. An ungoverned life is a life lost and carries other lives with it. The future is our concern and the secret of success is co-operation in preventive methods.

The present brilliant showing of the effort toward hospital standardization is significant of the widespread acceptance of this fact. Not union by coalition is advocated, nor by absorption of the lines of cleavage between the specialties, but union in separateness and along the lines of a new relation.

The success of the old time family doctor was not, of course, due to his vast knowledge of all sorts of diseases, but to his practical sense of the relations between morbid processes and his ability, through supervision over his families, to apply prophylactic measures in time. Out of his zeal to compass the orbit of knowledge and skill has grown this division of our art into the specialties, thus providing ampler opportunity for development of the inexhaustible mines of information. To keep this division from degenerating into what it was never meant to be, the creation of unrelated arts, and to insist upon return to the original basis, one indivisible science of medicine, should be the object of all medical societies in this reconstruction period.

Therefore the gynecologist, working in the new medium of standardization, can come before his colleagues of the related

[1] Read before the American Gynecological Society, Atlantic City, June, 1919.

specialties and make emphasis on those points in which he feels their co-operation is vital to his work. His own researches, fortified by the statistics of hospitals, permit him to show to what degree the lesions he handles are due to causes outside his domain in practice while well within his province of theory. For the most part he knows that he has to deal with the results of errors and neglect in the developmental and in the parturient periods, and with infections. He must therefore ask of internists, family physicians and of pediatricians, intensive efforts toward the control and safeguarding of the growing girl. Each time that an infantile uterus, with its train of subsequent evils, presents itself in an overworked school teacher, artisan, student or barren wife, he must make to those other specialties, a plea for the more thorough supervision of girlhood, and a campaign of effort toward elimination of the evils in our social and educational system which intensively cultivate the mind while destroying the body.

And when I say "destroying the body" it is unfortunately not in a spirit of sensationalism; it is a reference in cold blood to the already widely circulated reports of some of our leading authorities in obstetrical science who agree that the new type of woman appearing as the effect of overcivilization, is no longer fit for maternity. "Indoor life and nerve tension" having prevented normal functional development, they announce that it is now better that "the delicate nervous woman be delivered by cæsarean section than be subjected to the ordeal of labor."[1]

Have we, as gynecological specialists, charged primarily not with the disease but with the health of women, no reckoning to pay in this crisis? What have we been about while the female of the species has been coming to this tragic pass? The answer is plain: developing the art of cæsarean section to such an admirable simplicity that it is easier for all concerned than the trying "ordeal of labor"!

Gentlemen, the ordeal of labor existed before gynecology was known. No medical procedure is worthy to exist which has not for its object the sustaining and fortifying of natural functions as well as mending the results of unpreventable accidents. We must realize how much of the object of our first efforts has already been achieved, and stop short of suggesting the substitution in routine practice, of artificial for natural methods.

It is now that we as practioners of an organized specialty, must turn from the laboratory and clinic for the moment in our investigations of disease and join forces with all other medical organizations and lay movements in the study and promotion of preventive measures. Instead of making our supreme effort the giving to the delicate, nervous, incapable mother, a child by the easiest surgical method, let us take up the work of giving the children yet to be born their first right, the staunch and stalwart mother to whom her normal labor shall be an expected and a remembered blessing.

Again, each time that the gynecologist is confronted with the deplorable results of incompetent obstetrics he must turn to the obstetrician and offer co-operation in the battle against the blind and slipshod methods which permit all licensed and many unlicensed practitioners to practice this delicate and complicated and most important of all specialties. As I have recently pointed out in a discussion of the proportion of infant mortality and maternal morbidity due to improper obstetrics, it is not the obstetrical specialty which is to be blamed in this unfortunate state of things, for obstetrical work is not done by specialists to any major extent, but it is *they* who must carry the main burden of responsibility in all movements looking for amelioration of this intolerable situation. It is for them to demand that no one shall be permitted to do obstetrics who cannot show qualifications which measure up to standardized requirements; no one whose work is not open to scrutiny on hospital records; no one who is not more than willing to submit to all regulations undertaken for the sake of the patients committed to his care and of the public upon which he subsists.

Equally, when the unmeasureable results of infections of a preventable sort confront the gynecological practitioner, must he look

[1] Newell. Am. J. M. Sc., 1908, cxxxvi, 532.

to allied specialties for promotion of effort for the elimination of such infections and contagions as are responsible for the vast havoc to the tissues under his treatment.

Venereal diseases have been black-listed and barred by great campaigns undertaken in the interests of army efficiency and national pride, to an extent unpredictable in pre-war periods, and we have been shown that all such movements can be launched and well executed once the public mind has been moved in the right direction. But it has been only by means of the knowledge gained by the hard labor and devoted researches of the medical profession that these reforms have been possible. The public mind is not yet capable of instituting right measures for the control of disease processes without the guidance of the profession. But its immense agreement with medical suggestions in this hour of need, and its hearty co-operation with professional effort indicate what may be expected in any concerted effort for the benefit of public health conditions.

The gynecologist who comes in contact with so many forms of easily preventable diseases should increase his efforts to enlist the help of all other specialists to the end that such manifestations of morbid processes as come within this classification shall be lessened to a minimum by prevention.

Prophylaxis is not a new word, but we have had world illuminations on many old definitions and nowhere more clearly than on this word. The reconstruction of a world half ruined is proceeding along lines of prevention. There are no doctrines so emphasized today as the doctrines of prevention. The text of the day is preparedness, that we shall never again be so nearly destroyed by our own weak carelessness. It is the moment for pushing all methods of preventive medicine, and it is the business of each separate specialty to develop that too much neglected privilege of co-operation with its supporting neighbor.

My topic is the relation of gynecology to preventive medicine. I should only weaken its application if I attempted to show in what details certain diseases of women could be eliminated by preventive measures. These details are perfectly well known to those who listen; neither is it any new knowledge I bring, but as all propositions that are essentially true undergo development and take on force with the changes of the years, this interdependence of specialties has assumed vast importance since it is being brought to book by the advocates of preventive medicine, both professional and lay. It only needs the tremendous emphasis that can be put upon it by united effort to bring it to the forefront of medical consideration; and my purpose in this paper will have been fulfilled if it goes as a message to those other groups who, like this, are considering today the problems of health in a race that never felt its need so deeply.

As gynecologists we can offer the most comprehensive program dealing with the health of women, and immediate and full co-operation with other specialties on our part will result in as widespread and momentous effects as those we have already alluded to as following the campaign against venereal diseases in our army. And the need is bringing this emphasis, not as an indictment of the past but as a legitimate outgrowth of all past efforts.

Just at the beginning of the war period a glance over special society programs showed the dawning recognition of this vital demand for co-operation in preventive medicine. I have before me one significant paper read to a gathering of gynecologists, and its text is the absorption of these specialists in the details and practical aspects of their work to the exclusion of the theoretical part which concerns itself with research into etiology. I maintain that there is much to be said for the defense in this case. American medicine is a self-made thing. It has lacked endowed institutions; it has been obliged to deny emoluments to the devotee of pure research; it has been built up by the average man of big ambition to excel, and a very real purpose to perform thoroughly his responsible duty of making the sick well. It has been practically essential that he apply himself to the thing to be done and the way to do it.

It must not be forgotten that underlying

the enthusiasm with which the American practitioner has developed the specialties, has been this very urge toward wider knowledge. He has felt that associations of colleagues devoted to the development of one line of work offer the best substitute for the endowed institution, and it has been all he could afford. It would be difficult to prove that this method has not had distinct advantages in favor of public health, which is after all the *sine qua non* of the art of healing. For we have now as a result of all this intensive special application, the demand for practical knowledge of laboratory theories of disease prevention, a return, as it were, of the demand for the "general" medicine man" who was a sort of résumé of all the specialties.

The answer to this demand is not to be along the lines that were suggested before the war period, i. e., wider knowledge of all the branches by each specialist. The volume of necessary knowledge has loomed too large for any such solution to be practical. The answer must be found in this union of all the specialties into a co-operation for the development of preventive medicine.

As I have said, it is beyond the scope of this paper to point out the degree in which gynecology is interrelated to obstetrics, to pediatrics, to the department of the alienist and the internist; its whole intent is to leave with you a deeper sense of the high position to which this specialty may attain when it has realized its full opportunities for co-operative effort, and a heartier zeal to keep in touch, both in private practice and in public work, with the great impetus toward preventive medicine.

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THE ETIOLOGY OF TUBAL PREGNANCY [1]

BY G. BROWN MILLER, M.D., F.A.C.S., WASHINGTON

THE etiology of tubal pregnancy has been much discussed and we are all familiar with the causes usually given. I wish to present for your consideration, a factor in the production of the condition which I have never seen mentioned in any of the textbooks or the papers which I have read upon the subject.

I have had about a dozen or more cases, with a history about as follows: A woman misses her period and not wishing to go through pregnancy, begins after a few days to take drugs to bring on menstruation or to produce an abortion. It may be she introduces catheters or other bodies into the uterus. After an interval of a few weeks, she exhibits the signs and symptoms of a tubal pregnancy. Operation shows this to be the true condition.

The number of such cases which I have had has been so great and the histories so typical that I have been forced to the conclusion that there is a causal relation between the taking of oxytocics, and perhaps the other measures commonly employed in the production of an early abortion, and tubal pregnancy.

I have no definite or experimental data to confirm such a conclusion, but the arguments in its favor can be stated briefly as follows:

1. Impregnation can occur just before a menstrual period.

2. The length of time between the fertilization of the ovum and its implantation in the uterine cavity is generally given as between 7 to 9 days, but it may be longer.

3. Anything which interferes with the passage of the ovum along the fallopian tube is recognized as a cause of tubal pregnancy. Tumors in the uterine wall, torsions of the tube, chronic salpingitis, etc., are some of the causes of tubal pregnancy.

[1] Read before the American Gynecological Society, Atlantic City, June, 1919.

Ergot and similar drugs produce contractions of the uterine muscle, and perhaps of the tube. The introduction of foreign bodies into the uterine cavity likewise produces such contractions. These contractions of the uterus must interfere with the passage of the fertilized ovum down the tube and thus they would tend to the production of a tubal pregnancy.

Thus it seems to be entirely possible to produce a tubal pregnancy in the attempts to bring on an early abortion.

That such is actually the case seems to be shown by the considerable number of cases which have come under my care, the histories of which would show the cause of tubal pregnancy to be some attempt to bring on an early abortion.

TOXIC EFFECTS OF FIBROID TUMORS OF THE UTERUS[1]

By R. R. HUGGINS, M.D., F.A.C.S., Pittsburgh, Pennsylvania

A REVIEW of the work already done in the study of fibroid tumors of the uterus would lead to the conclusion that there is very little left to say about the pathology or clinical manifestations associated with their growth and development. In a larger way this is true, but it seems that we still view with complacency some of the complications which, while not always serious, are, nevertheless, important and should command our attention. In the absence of other symptoms it has been suggested that the absorption of toxins incident to the growth of fibroid tumors may account for certain changes in the heart muscle, which undoubtedly occurs in a high percentage of cases. The final proof of this theory remains for the chemist to determine, but in the meanwhile it is important that we as clinicians do not overlook certain changes, which under other circumstances are commonly accepted as due to toxic products. The frequency of nervous symptoms oftentimes mild in character, but not infrequently severe; the relatively large number of cases of infection of the kidney secondary to even small fibroids where there can be no question about the absence of pressure upon the ureter or other causes, all point strongly in favor of such theory.

Since Kaprezik in the year 1881 first called attention to the frequency of weakness in the cardiac muscles associated with uterine myomata, about 25 articles have been written by gynecologists and surgeons on this subject. It is the consensus of opinion that heart changes are present in from 40 per cent to 50 per cent of the cases. This has been learned from sad experience oftentimes, and there can be no doubt that the severity of the disturbance to heart action in some of these cases during and following operation is secondary only to that which occurs in thyroid disease. In early years "paralysis of the heart" was given as the cause of death after autopsy had revealed no other excuse.

Fleck made pathological examinations which led him to conclude that brown atrophy of the heart muscle is characteristic of fibroids without hæmorrhage, and that fatty degeneration is present when profuse hæmorrhage accompanies the growth. He also believes that the change in the heart muscle was explained by abnormalities in metabolism. He made a study of 325 cases and found either functional or organic changes in 40.8 per cent. In every instance where an autopsy was made definite cardiac changes were found; e.g., fatty degeneration, brown atrophy, etc. He does not believe the heart changes were due to loss of blood because out of 133 cases in which there had been no hæmorrhage cardiac changes were present in 34.6 per cent.

In reporting fatal cases where death occurred several days following operation, Deaver states: "While some of these deaths may be attributed to shock and exhaustion, yet I am convinced that in a number death was caused by pre-existing cardiac and cardio-

[1] Read before the American Gynecological Society, Atlantic City, June, 1919.

renal disease. Boldt in a study of his own autopsies has always found degenerative changes in the heart muscle, whether or not the neoplasms had given rise to menorrhagia. He further states that clinical experience teaches that patients with myoma have a weak heart muscle.

Winter insists that an etiological relationship between myoma and heart disease has not been proved and that the heart is influenced only by the secondary anæmia due to the hæmorrhage which is caused by the myoma. He admits, however, that 60 per cent of a series of 266 cases where a study of the heart was minutely made showed a "myoma heart." Such change in the heart muscle is not infrequently recognized by men of large experience.

Kelly has recently said: "In relation to the uncertainty of recovery following operation in both skilled and unskilled hands there is the ever present dread of cardiac embolism often occurring about the time the patient is superintending the packing of her grip, happy in the anticipation of the home welcome." Any operator of experience may appreciate this statement and will agree.

It is perhaps true that sudden death which occurs several days after operation and attributed to cardiac or pulmonary embolism is often really the result of a dilatation of the heart secondary to a weakened muscle. Careful autopsy reports are not often given, and a study of the clinical symptoms suggest that the diagnosis of embolism is given because of habit.

No particular form of cardiac degeneration is distinctly attributable to myomata, but it is logical to conclude that fatty degeneration is the most frequent change. That arteriosclerosis is occasionally found without any other associated cause is quite evident. We have been interested in a number of cases where there was an absence of hæmorrhage or other complications, but in whom were found marked clinical signs of a weakened cardiac muscle. The condition was so plainly evident in some instances that it was necessary to keep the patient at rest for several weeks before operation could be undertaken without serious risk. This has occurred when the tumor was small and under ordinary circumstances would be classified as a so-called symptomless fibroid.

A group of symptoms overlooked and often given but scant consideration are those referable to the nervous system. Certain individuals are very susceptible to even the slightest absorption of toxic products. It is for this reason we find such a wide variation in the degree of such symptoms associated with fibroid tumors. Observation would lead to the belief that the type of woman who shows susceptibility to the toxins of pregnancy is also likely to show nervous symptoms from the effect of a growing myoma. The disturbance may be mild, but not infrequently it is quite severe, and may result in a serious mental impairment. This does not occur in women with stable nervous organization to any serious extent, but careful study shows its presence to a greater or less degree in so many instances that it cannot be dismissed without consideration. The frequency with which such symptoms occur secondary to toxic effects in other conditions is well recognized and leads us to conclude that there is no question about the relationship. A study of our histories show the presence of nervous symptoms in cases of so-called symptomless fibroids sufficiently often to attract attention. That the toxicity incident to a disturbed thyroid secretion is markedly increased by a growing fibroid is quite apparent.

The frequency with which urinary disturbances associated with fibroids are found is also of interest. The element of mechanical interference with the ureter must always be taken into consideration, but casts, albumin, and pus occur in a considerable percentage where there is no such pressure. This cannot be assigned as a cause when the fibroid is small or located in such position that it interferes in no way with the ureter. In large growths it may be a factor. For a long time it has been our belief that pyelitis in the early weeks of pregnancy can be due to no other cause than infection which results from a lowered resistance of the individual, secondary to absorption of the toxic products of pregnancy. That it occurs in patients with other toxic symptoms and that the severe

cases occur most frequently in primipara and often in the early week, all favor this conclusion.

The same effect apparently occurs in fibroids where the individual is susceptible with the result that a most persistent infection of the pelvis of the kidney is produced. We have treated several patients for a chronic pyelitis without any apparent relief, who had small tumors of the uterus which in no way blocked the ureter. They sought relief for pain in the affected side and bladder symptoms, rather than any symptom directed to the growth itself. In several cases of this kind persistent treatment of all kinds, including irrigation of the kidney pelvis, failed to cure the infection, and it has been our experience that where this condition has persisted for a long time that even after the removal of the tumor, the urinary symptoms persist. This is due to involvement of the deeper kidney structure, so that eventually if a cure is obtained it is through the removal of the kidney. Delay in early diagnosis as to the cause of such a change in a kidney is, therefore, fraught with serious consequences to the patient.

In the briefest way we venture to report a few cases which have drawn our attention to the importance of considering this phase of the subject. The examples given represent the effect upon the heart and kidneys. If space would permit the detailed report of six cases of temporary insanity associated with fibroid tumors would be strongly corroborative. In all bleeding and pressure symptoms were absent and the patients recovered their normal health after the removal of the growth.

Until this problem is solved by a better knowledge of what happens when cells multiply under abnormal stimulation all deductions are purely speculative. Much of our progress has been made by the suggestions offered through clinical studies, and without them the chemist would find little inspiration.

It may be that more careful observation of the character of the cells, the lymphatics and blood-vessels in these so-called benign growths and the correlation of the same with the clinical symptoms in the individual patient will lead to a better understanding of this interesting subject.

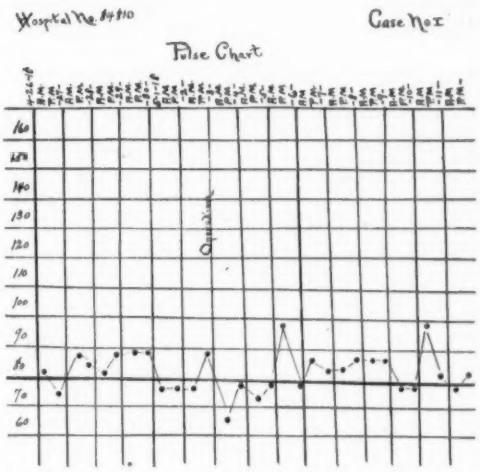

Chart 1. Case 1. This chart shows what a mild reaction followed spinal anæsthesia. For this reason it is indicated in cases where there is a weak heart muscle.

CASE 1. Miss R. M., age 45. No. 84810. Referred by Dr. Mitchell. About ten years ago the patient noticed some discomfort in the lower abdomen. This gradually increased in severity until her admission to the hospital. There has been no severe pain. About five years ago the patient noticed some enlargement in the abdomen (lower portion), and paid little attention to it thinking perhaps it was a normal condition. For many years the patient has noticed some shortness of breath on exertion, and feels that there has been a gradual increase in the amount of this disturbance during the last few years. This symptom was much more marked during the last few months. There have been no pressure symptoms aside from some disturbance from the bladder which was apparently due to the presence of the fibroid; no swelling of the feet or lower extremities. The patient is well-nourished and looks apparently well. Menstruation began at the age of ten; has always been regular, flow lasting three to four days. There has been some increase during the last year but no free flow. No intramenstrual bleeding. Examination revealed the presence of a fibroid of the uterus, the size of an ordinary foot-ball. To a casual observer the patient presented the appearance of one in good health. The patient entered the hospital for operation. The first night she had an attack of pain in the region of the heart and upper abdomen which was undoubtedly due to cardiac weakness. The picture was typical of angina pectoris. Careful study of the heart showed the presence of a chronic myocarditis with dilatation and some decompensa-

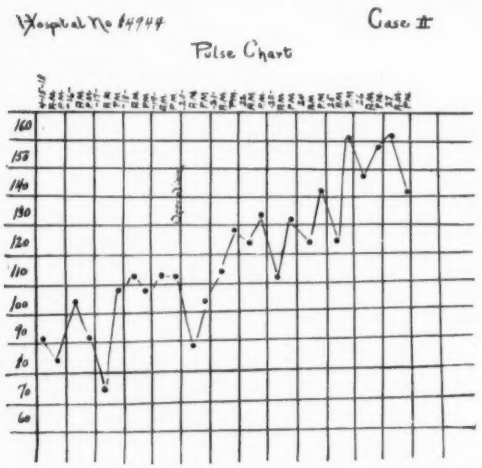

Chart 2. Case 2. This chart shows the rapid increase in heart rate after operation, using ether anæsthesia.

tion as evidenced by stethoscope, œdema, and slight congestion at the base of both lungs. Careful study revealed no cause in the past history and no excuse in the present condition of the patient other than the fibroid for the marked change in the cardiac muscle. There had been no hæmorrhage. The red cells were 4,080.000 and hæmoglobin 84 per cent. We were compelled to keep this patient in bed for eight weeks before the heart muscle regained sufficient strength to withstand the strain of an operation. This was done finally under spinal anæsthesia for the purpose of conserving the cardiac strength. The patient made a good recovery but required great care throughout convalescence. Four weeks after operation the patient had a return of the pain with shortness of breath when attempting to sit up in a chair, necessitating further delay in exercise. This patient is today, one year after operation, in good health and entirely free from cardiac symptoms.

The specimen consisted of a large irregular mass due to the presence of multiple fibromata. They varied in size from 2 centimeters to 9 centimeters in diameter. No degenerative changes were present, except in one there was a deposit of a gritty yellow substance, not unlike bone. In the absence of hæmorrhage, degenerative changes in the fibroid, syphilis and focal infections, this patient offered the most convincing proof of the effect of absorption from cell change incident to the growth of a simple fibroid of the uterus.

CASE 2. Mrs. M. W., age 38. No. 84944. April 15, 1918. The patient was admitted with a history of having noticed an enlargement in the lower abdomen one year ago. She had no menstrual disturbance. The red cell count is 5,130,000; hæmoglobin 84 per cent. Examination revealed the presence of a fibroid about the size of a foot-ball. It was very movable and gave the impression of a pedunculated growth. The heart muscle showed evidence of marked weakness and the patient was placed in bed for rest preparatory to operative treatment. Six days after admission the patient complained of a sudden severe pain in the abdomen with a change in the position of the tumor. The tumor had become twisted on its pedicle and was strangulated. We could not postpone operation for any further treatment. Under ether anæsthesia the fibroid was removed. The twist resulted from an elongated condition of the broad ligaments. The tumor together with the body of the uterus had turned to an angle of 60°, the pedicle being formed by the broad and round ligaments. There was no evidence of infection and the operation was quickly done without difficulty. The heart showed no reserve strength, the patient dying at the end of 48 hours without any response to stimulation of any kind. Autopsy showed no intraperitoneal complication. The heart showed marked change as a result of fatty degeneration.

CASE 3. Mrs. T. F. M., age 38. No. 56538. The patient was admitted with a history of attacks of pain in the right abdomen. Character of pain and symptoms were suggestive of cholecystitis, but the diagnosis was uncertain and many signs pointed toward the appendix as the chief etiological factor. Pelvic examination revealed the presence of a fibroid the size of a lemon. There were no symptoms referable to the pelvic organs and menstruation had been normal. The patient was extremely nervous and complained of occasional attacks of palpitation of the heart. Her physician, Dr. Simonton, considered the heart muscle to be in fair condition and equal to the operative strain. The general appearance of the patient suggested very good health, but close study showed marked evidence of the effect of toxic absorption from some source. Exploration revealed no evidence of gall-bladder trouble. The appendix was enlarged, adherent and presented the usual appearance of chronic inflammation. It was evidently the cause of pain and was removed. The fibroid was not disturbed on account of the absence of symptoms referable to it. The postoperative course was normal except for some slight elevation and intermission of the pulse for a few days. She was allowed out of bed on the fourteenth day and was apparently in good condition. After sitting up for an hour she returned to bed and suddenly collapsed from what was clearly a dilatation of the heart. In spite of all stimulation and treatment the patient died 24 hours later from a rapidly failing heart action. As I recall the details of this case it is apparent that the fibroid was the chief cause of this woman's cardiac weakness. We had not yet awakened to the necessity of accurate study of the strength of the cardiac muscle in all such cases.

CASE 4. Mrs. F. I., age 39 years; married; Home Duties. No. 78643. The patient had the

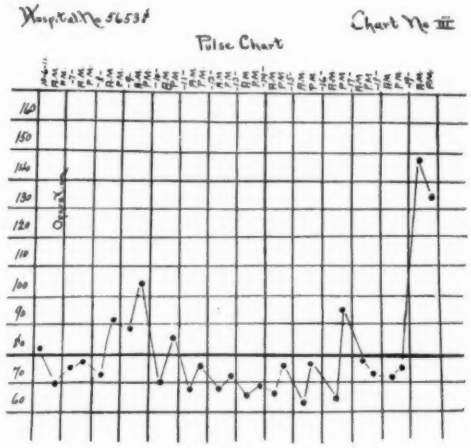

Chart 3. Case 3. This chart shows sudden increase in heart rate ending in death within 24 hours.

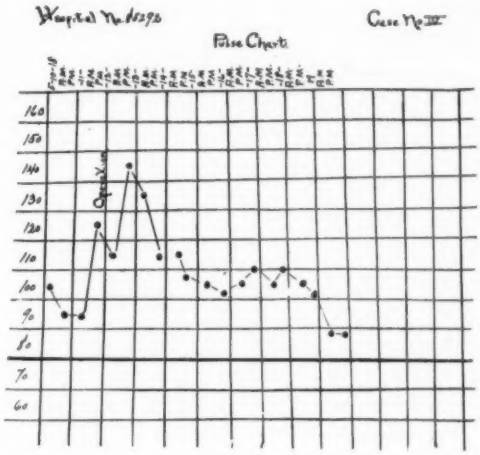

Chart 4. Case 4. This chart shows marked reaction following operation. No apparent cause except the fibroma.

usual diseases of childhood. Never had any serious illness of any kind. Health was very good until October, 1917. At this time the patient complained of backache and a feeling of fatigue following long automobile rides. Since that time, there has been more or less constant backache and an increased sensation of weakness. Menstruation began at the age of thirteen years; has always been regular, flowing every 28 days; lasting from three to five days. The flow is not excessive and is not accompanied with pain. She gives an apparently normal menstrual history. The patient is referred for examination of the pelvic organs to determine the presence or absence of any condition which would be a positive factor in the cause of the backache and fatigue. The general history suggests no pathological change in the pelvic organs. Examination, however, reveals the presence of a fibroid about the size of a small lemon located on the anterior wall of the uterus. There is no disease of the adnexa, nor is there any tendency to downward displacement of the uterus. Wassermann and all examinations have been negative except the finding of the fibroid tumors of the uterus.

Chronic fatigue due to muscular weakness as a result of chronic toxæmia from the presence of the fibroid tumor of the uterus. Backache due to the weakened ligamentous supports of the vertebræ resulting from a general condition rather than any reflex or direct symptoms due to pressure of the fibroid. A study of the heart showed corresponding weakness of the muscle. There seemed no lack of compensation and while there was apparent weakness it did not seem sufficient to contra-indicate operation. A glance at the chart will show that for 48 hours the rapidity and action of the heart was all out of proportion to the usual run of simple uncomplicated hysterectomies. The patient made a good recovery and all symptoms disappeared. The specimen was a fibromyoma without any degenerative changes. There was a considerable amount of smooth muscle tissue present.

Case 5. Mrs. L. G. Hospital No. 78643. This patient presented the typical symptoms of toxic absorption. She was referred for examination by Dr. Litchfield to find some cause for a persistent high blood pressure, the cause of which he had been unable to determine, but thought it was based on some form of toxæmia as it was not due to any kidney change or the usual cause of arteriosclerosis. She complained of frequent attacks of headache and drowsiness. Her blood pressure was 200. There was considerable swelling of the face at times. Although there were no signs referable to the pelvic organs, examination revealed the presence of a fibroma of the uterus the size of a large orange. It was removed February 3, 1917. At the present time this patient has a blood pressure of 160. There has been marked relief from the former symptoms which existed previous to operation. One of the interesting features about this case was that the growth was composed almost entirely of muscular tissue. We have noticed that toxic symptoms are more likely to be present when the tissue contains a preponderance of muscle rather than dense hard connective tissue as in the ordinary fibroma. The presence of the various forms of degenerative changes must always be taken into consideration. This has not been true in the cases here reported.

Case 6. Miss L. B., admitted to Hospital March 23, 1916. Hospital No. 74630. The patient had been complaining for several years of pain in the right lower quadrant of the abdomen. The appendix had been removed without relief. She had been under observation for one year previous to admission and was treated for a per-

sistent pyelitis in right kidney without relief. There was a fibroma of the uterus present which was about the size of a large orange. Aside from backache there were no symptoms referable to the fibroid but the pain in the side and region of the kidney gradually increased in severity. The amount of pus in the urine also increased and there was considerable irritability of the bladder. The fibroid was removed. For the past three years the patient has been in good health and without any urinary symptoms. There are still some pus cells in the urine, which show continued impairment of the kidney. The improvement in strength and muscular tone was rapid after the operation, showing the marked toxic effect of the tumor.

CASE 7. Mrs. L. K., Hospital No. 69659. This patient was interesting on account of having a double pyelitis complicating a fibroma which had given no symptoms. After treating the infection for several months without any improvement, it was decided to remove the tumor, which was no larger than a grapefruit. There was considerable impairment of kidney function and marked irritability of the bladder. A hysterectomy was done June 15, 1916. Since the operation the patient has made wonderful improvement in a general way. While there are still some urinary symptoms occasionally, they are infrequent and mild in character. There is pus in the urine at times but no distress in the bladder.

It has been our experience in these cases of chronic pyelitis when not dependent upon some mechanical factor that complete recovery seldom occurs from any form of treatment.

CASE 8. Mrs. M. K., age 38, No. 79883. Referred by Dr. Sherrill. The patient was first seen in June, 1916. Examination at that time revealed a pyonephrosis of right kidney and fibroid of the uterus. On account of severe illness a nephrotomy was done and the kidney drained. The patient improved but did not fully recover and the kidney was removed June 3, 1916. At that time the fibroid had increased somewhat in size but it was not considered safe to remove it. The urine from the left kidney was negative. The patient returned for examination in April, 1919. She complained of some discomfort in the region of left kidney with occasional discomfort in the bladder. There were a few pus cells present in the urine. The fibroid had doubled in size. It was apparent that the pelvis of the left kidney was slightly infected. Fearing serious change in the kidney the fibroid was removed May 20, 1919. From the study of the symptoms and previous history we concluded that the infection of the kidneys was the direct result of the toxic absorption incident to the fibroid tumor. There was no hæmorrhage and the fibroid was symptomless except for the general evidences of toxæmia which was exhibited by considerable anæmia and chronic fatigue.

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THE ORIGIN OF THE INTRAPELVIC TREATMENT OF THE STUMP AFTER SUPRAVAGINAL HYSTERECTOMY FOR FIBROID TUMOR OF THE UTERUS; TO WHOM BELONGS THE CREDIT?[1]

By J. RIDDLE GOFFE, A.M., M.D., F.A.C.S., New York

I VENTURE the opinion that in the whole range of gynecological procedures there is no operation dealing with an equally serious condition that is attended with so little loss of life and is fraught with so much satisfaction to both patient and operator as supravaginal hysterectomy for fibroid tumor. Today it is the accepted standardized operation in practically every surgical clinic throughout the world. It has made it possible, for example, as recorded by Dr. LeRoy Broun, to operate upon 262 cases of fibrosis by this method in one year, viz., 1918, at the Woman's Hospital, New York, with a mortality of 4 patients, or 1.52 per cent, and that too by the entire staff of at least 15 operators. This stands out in striking contrast to the record of a similar number of distinguished operators as presented by Knowsley Thornton, in 1882, by the old method, showing 202 cases and 80 deaths, a mortality of 38.67 per cent.

The credit of inventing such a procedure is an honor worth guarding with jealous care. In some clinics it is spoken of as the Baer operation, and by many believed to have been invented by him. It is not surprising that in the addition to the armamentarium of surgery of so valuable a procedure any one who has taken any part in contributing to its development and perfection should claim recognition for his work, and in his enthusiasm overstep the bounds of what may be his just due. The supreme honor of having one's name the dominant one in such an achievement, however, should not rest upon a non-essential modification or refinement of detail. The question is who had the good fortune to conceive the idea, plan the details to make it practicable and safe, and finally the courage to carry it into execution and demonstrate on a living subject its safety and its virtues?

Published records show that after having devised the scheme of the operation and having gone over in my mind many times during the succeeding years the successive steps of the procedure, I ventured to apply it in the case of a living woman at St. Elizabeth's Hospital, New York, May 29, 1888. The patient made a prompt and excellent recovery, leaving the hospital at the end of the fourth week. I was assisted at the operation by three well-known New York surgeons who have testified to the occurrence and the truthfulness of my report. This was indeed a triumph. I had dared to drop the pedicle into the peritoneal cavity and that too with impunity. Hæmorrhage was perfectly controlled so that the patient lost no blood either at the time of operation or subsequently. To be sure slight suppuration had occurred but the peritoneal cavity was protected against infection by the peritoneal flap and drainage was promptly and efficiently secured through the cervical canal. The patient had convalesced as comfortably as after an ovariotomy. Three cases succeeded this in rapid succession, all attended with prompt and satisfactory recovery.

Here then was an entirely new and original method, embracing untried features and meeting all the requirements of a perfected surgical procedure. First and foremost it solved the problem of dropping the pedicle and closing the abdominal incision without drainage. Second, it covered all raw surfaces with peritoneum. Third, it fastened the infundibulopelvic and round ligaments to the stump, and conserved the attachments of the cardinal ligaments, thus preserving the supports of the pelvic diaphragm, and lastly, it restored the pelvic organs to their normal positions and relations in the pelvis, disposing of all traumatic tissue with the nicety of a plastic operation.

I wrote a careful description of the operation in a detailed report of the four cases and presented it in a paper before the Obstetric and Gynecologic Section of the New York

[1] Condensed summary of paper read at the meeting of the American Gynecological Society, Atlantic City, June, 1919.

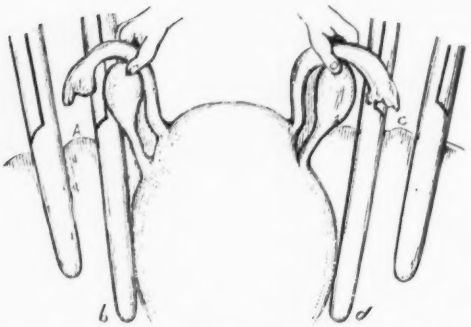


Fig. 1. ' Posterior view. Forceps in place. The broad ligament is then cut down, between the forceps, *a* to *b* and *c* to *d*. The elastic ligature is then thrown around, and the entire mass cut away.

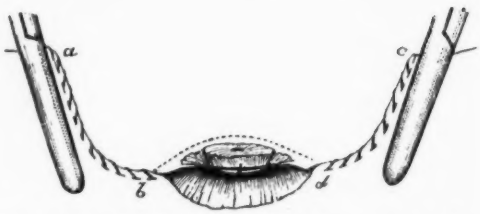
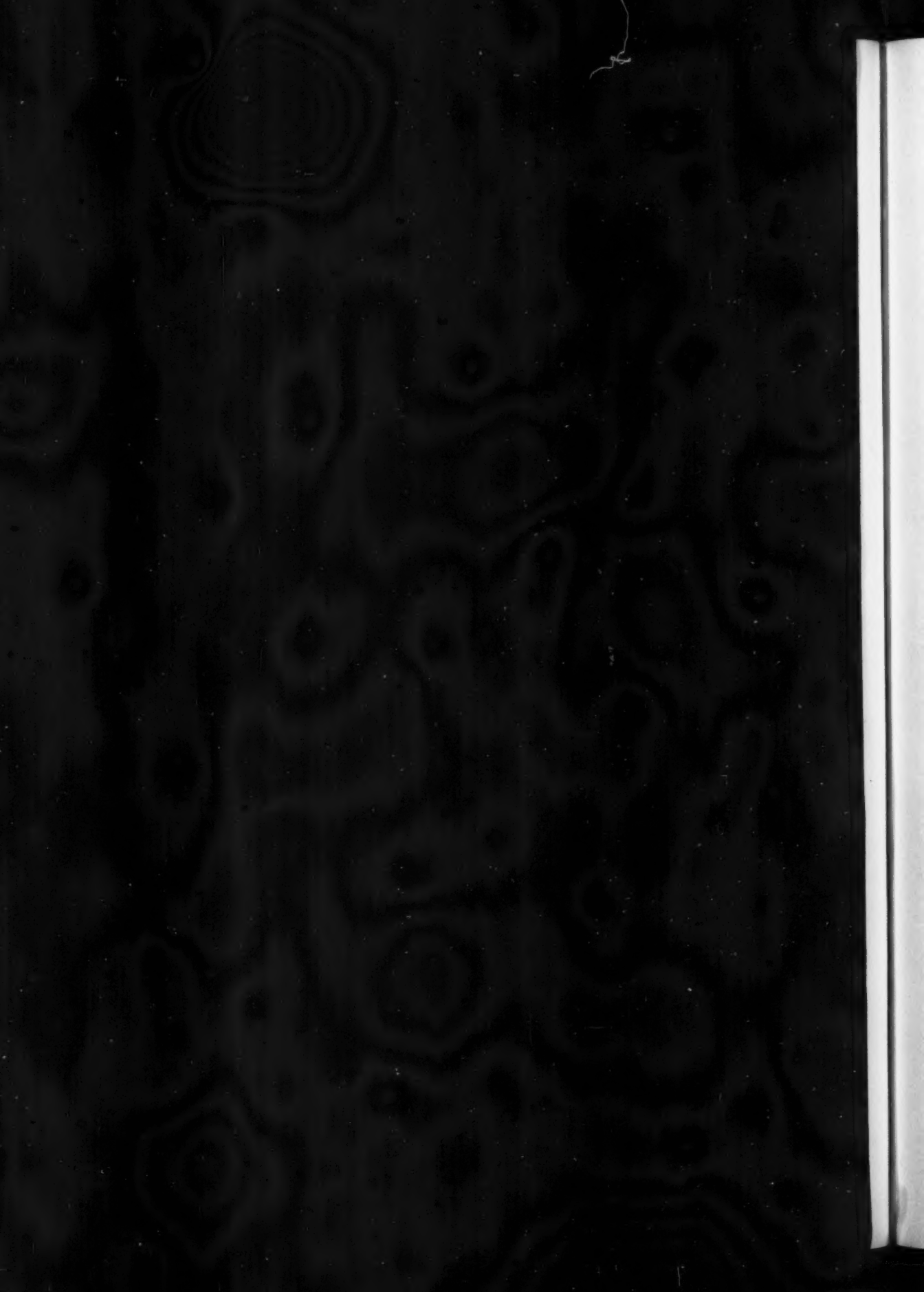


Fig. 2. Showing ligature applied and stump trimmed down; the lower part of broad ligament containing uterine arteries at either side of the stump. The raw surfaces are then whipped over and over with catgut from *a* to *b*, the anterior and posterior flaps being caught up and stitched along the dotted line, and the continuous catgut continued to *d*.

Academy of Medicine, March, 1890. It met with most cordial approval and many complimentary remarks by the Fellows of the Academy who discussed it. The paper appeared in April, 1890, in the *American Journal of Obstetrics and Diseases of Women and Children* with the illustrations which are reproduced here. The operation was employed later by Dr. Janvrin, Dr. George Tucker Harrison, Dr. A. P. Dudley, and others with satisfactory results, thus establishing it as a recognized procedure.

In September, 1892, four years and five months after my first operation and two years and four months after the publication of my paper, Dr. Baer, of Philadelphia, read a paper before the American Gynecological Society in which he reported 10 cases of fibroid tumor with one death, operated upon by what he claimed to be "an entirely new and original operation." Now on careful analysis the operation in its essential features was my operation simply modified by transferring the main ligature from the cervix to the uterine vessels in the broad ligaments. In my fourth case (see original report) I ligated the ovarian arteries in continuity in the broad ligaments and one uterine artery. Dr. Baer followed me in this but he "went me one better" and ligated both arteries in the broad ligaments thus doing away with the ligature on the cervix.

While this modification was a refinement in this one detail of my original operation, which I gladly recognized and adopted, it was not essential to the success of the procedure; for while Dr. Baer reported 10 cases with one death my first series detailed 4 cases with no death and my second publication recounted 15 cases with 1 death. It was, therefore, a modification of one feature of my operation, a refinement to be sure, but of minor consideration in comparison with my original concept, its audacity and its perfection of detail. I, therefore, claim precedence as the inventor of this operation. If any one's name is to be attached to it, it should be known as the Goffe operation.



ACTINOMYCOSIS OF BOTH OVARIES AND FALLOPIAN TUBES

The Report of a Case, Operation, and Recovery; With a Tabulation of All the Cases of Actinomycosis of the Female Genitalia Recorded in the Literature

By M. R. ROBINSON, M.D., F.A.C.S., New York

FREQUENCY

THE invasion of the human body by the ray fungus, was first described by Israel (1) in 1877, just one year after its discovery in bovines by Bollinger (2). Since then many studies dealing with the bacteriology, the pathology, and the clinical course of the disease, have from time to time appeared in the literature. No tissue seems to be immune and, among the rarest to be affected is that of the female generative organs.

Illich (3) in a study of 421 cases of actinomycosis in man, has found its distribution in the following order: 51.8 per cent of the neck; 13.8 per cent of the lungs; 21 per cent abdominal (chiefly intestinal); 2.6 per cent of the skin; and the rest undetermined. Harbitz and Grandel (4) have collected 87 cases, among which 45 per cent involved the cervical fascia; 23 per cent the respiratory organs; 30 per cent the intestinal canal; and 2 per cent the skin.

In neither of the above quoted reports is there any mention made of genital actinomycosis. Kohler (5) states that up to 1914, 25 cases of actinomycosis of the genitalia have been recorded. My investigation resulted in a collection of 19 cases only. The reason for this variation in numbers is due to the fact that I have endeavored to include only those cases where the diagnosis has been proved, and where the involvement has actually been of the reproductive organs.

THE POINT OF ENTRY

How does this bacterium gain access to the tissues? According to Israel (1) the most favorable routes of entry, are in the order of their frequency: (a) the mouth, (b) the respiratory tract, and (c) the gastro-intestinal canal. Bostroem (6) has added a fourth avenue of invasion (d), the skin.

PATHOLOGY

Having lodged in the tissues, how does this organism spread? Does it take place by continuity only, or does the blood stream assist in its further distribution? What factor if any does the lymph current play in this rôle?

The two first named agencies are about equally potent. MacFayden, quoted by Berry Hart (7), believes that the cocci are carried by the plasma, having found their way into the blood current by breaking through the blood-vessel walls. That this is the case may be readily appreciated from the pathological changes wrought by the ray fungus. In its spreading, this organism does not follow any definite anatomical landmarks, such as fibrous or muscular planes, but proceeds in a lawless fashion, ruthlessly destroying every tissue in its path. It produces complete necrosis and suppuration, the formation of excessive granulations, and the replacement by connective tissue to so marked a degree, that the original morphology can hardly be recognized macroscopically, and at times not even microscopically. My own case, the pathology of which I shall discuss later, serves as a concrete example of these findings.

Regarding the importance of the lymphatic channels as carriers of this infection, the consensus of opinion is in the negative. For in none of the cases observed, have the lymph-nodes been found to be enlarged. Should a case of actinomycosis present lymphatic involvement, then it would only mean that the lymph glands were invaded by continuity, the same as any other tissue that chanced to lie in the path of the invading mycelium. The hypertrophy of these glands could in no sense be interpreted as a defensive response, such as is witnessed in tuberculosis and malignant affections.

TABULATION OF ALL CASES OF ACTINOMYCOSIS OF THE FEMALE GENITALIA RECORDED IN THE LITERATURE UP TO DATE

No.	Year	Author	Source	Age	Diagnosis Established			Primary Focus	Parts of Genitalia Involved	Therapy Employed		Results		
					Macroscopic	Microscopic	Bacter.			Operation	Palliat.	C?	I.	D.
1	1883	Zeemann	Wien. med. Jahrb., p. 476.	40	x	....	....	Vagina and intestine. This was later disputed by Israel, who claimed the intestinal entry as the proper one.	Right tube.	x	....	....	....	x
2	1883	Zeemann	Wien. med. Jahrb., p. 476.	50	x	....	....	Intestine	Left ovary	x	....	....	....	x
3	1892	Samter, E.O.	Arch. f. klin. Chir., xliii, 257.	?	x	....	....	Rectum	Left ovary	x	....	....	....	x
4	1893	Stewart and Muir	Edinb. Hosp. Rev., vol. i, p. 96.	35	....	x	....	Vagina	Tubes and ovaries	x	....	....	....	
5	1893	Rectenbacher	Wien. klin. Wchnschr., xli, p. 738.	19	x	....	....	Intestine	Uterus tubes and ovaries	x	....	?	....	....
6	1895	Habel, A.	Arch. f. path. Anat. etc., Berl., cxlvi, 1.	45	....	x	....	Intestine (rectum)	Both ovaries	x	....	....	....	x
7	1898	Giordano	Cited by Rosenstein (*vide infra*)	?	x	....	....	Uterus	Uterus	x	....	?	....	....
8	1899	Geldner	Monatschr. f. Geburtsh. u. Gynaek., xviii, 693.	15	x	....	....	Intestine?	Both ovaries	x	....	....	....	x
9	1900	Litten	Deutsch. med. Wchnschr. iii, 17.	39	x	....	....	Liver	Right ovary	x	....	....	....	x
10	1902	Henriot	De l'actinomycose des organes genitaux.	21	x	....	....	Left uterine adnexa	Left uterine adnexa	x	....	?	....	....
11	1902	Hart, Berry	J. Obst. & Gynæc. Brit. Emp., p. 251	49	x	....	....	?	Left ovary	x	....	....	....	x
12	1904	Rosenstein	Ueber die Aktinomykose der Weiblichen Adnexe. Arb. a. d. Geb. d. path. Anat. u. Bakteriol., iv, 248	17	x	x	....	Intestine	Right ovary	x	....	x	....	....
13	1905	Verocay, Jose	Verhandl. d. deutsch. path Gesellsch.	14	x	....	....	Rectum or vagina	Uterus tubes and ovaries	x	....	....	....	x
14	1905	Schlagenhaufer	Verhandl. d. deutsch. path. Gesellsch.	18	....	....	x	Perirectal abscess	Left tube and ovary	x	....	....	....	x
15	1905	Schlagenhaufer	Verhandl. d. deutsch. path. Gesellsch.	38	....	....	x	Inferior maxilla	Tube and ovary	x	....	....	....	x
16	1906	Hamm	Strassb. med. Ztg., iii, 171	39	x	....	....	?	Fallopian tubes	x	....	?	....	....
17	1906	Neuhauser	Deutsch. med. Wchnschr., No. 36.	60	x	....	....	Appendix vermiformis	Uterus and right ovary	x	....	....	x	....
18	1910	Shaw, E. E.	Proc. Roy. Soc. Med., iii, 146.	38	....	x	....	Appendix	Left ovary	x	....	....	....	x
19	1914	Kohler, B.	Frankf. Ztschr. f. Path., xv, 146	33	....	x	....	Uterus (infection began soon after labor)	Uterus and left ovary	x	....	....	....	x

DIAGNOSIS

I am chiefly interested in the abdominal type of the disease, and I am in full accord with those observers who claim that, not until the tissue obtained at operation, is submitted to pathological examination, or the pus derived from a persistent sinus, or an incised abscess, is bacteriologically studied, can a diagnosis be established. It is seldom indeed, that the trained surgical eye can detect the yellow granules in the suppurating foci.

The clinical course of the disease does not help us materially in arriving at a diagnosis. The onset is insidious in character; the temperature is as a rule of a low type; unless the infection becomes mixed, there is no lymphatic involvement; and the agglutination and the matting together of the abdominal and the pelvic viscera, only serves to make confusion greater.

The two diseases for which actinomycosis is as a rule mistaken, are tuberculosis and malignant neoplasia. But if we bear in mind that the former is from its very inception accompanied by a typical temperature curve, and that the latter invariably invades the lymphatics, if we bear these two facts in mind, they may serve us as important points in the differential diagnosis.

Another clinical fact, which seems to me is of diagnostic value in cases of ovarian actinomycosis, is the early onset of amenorrhœa. Amenorrhœa is also a concomitant symptom in tuberculosis, but there it is due in the main to the general debility of the individual, and not to the tubercular affection of the ovaries *per se*. All of the cases of tuberculosis of the internal generative organs, which came under my observation, failed to present menstrual cessation as one

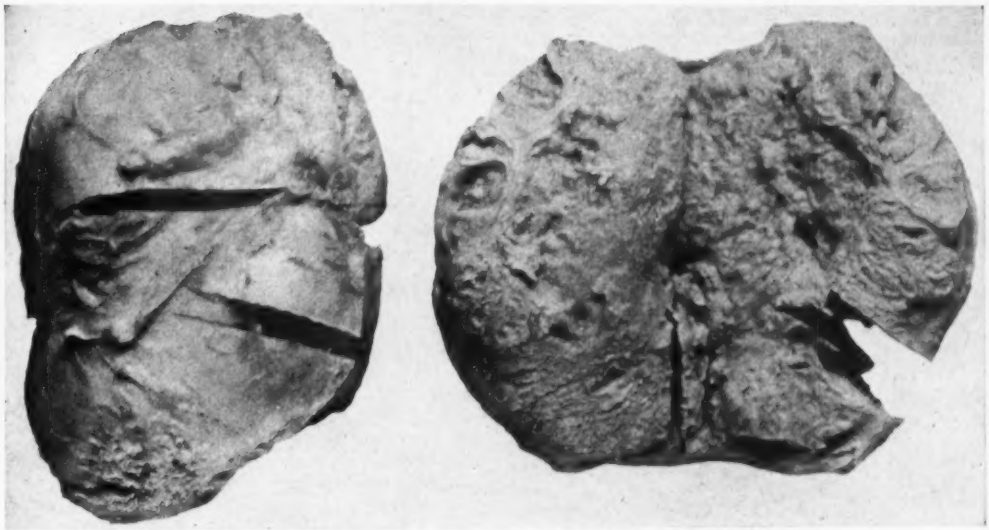


Fig. 1. Photographic reproduction of the ovaries, reduced one-sixth. At left, tumor closed; at right, the appearance of tumor on cross section.

of the clinical phenomena. On the contrary, some of them suffered from menorrhagia or irregular menstruation, and those upon whom I have operated, and in whom I have endeavored to preserve one or part of one ovary, on account of their youth, the menstrual function has been retained for periods, varying now from 2 to 3 years and longer.

I can speak with equal certainty regarding the relation of menstruation to malignant growths of the ovaries. The few cases of this type upon whom I have operated, did not present symptoms of ovarian hypofunction. They suffered rather from excessive or irregular menstruation. These clinical facts are in full accord with the pathological data. For it seems that neither tuberculosis nor carcinoma or sarcoma of the ovaries destroy the tissues of these organs so completely and rapidly as does actinomycosis; hence the reason for the early appearance of amenorrhœa in this group of cases.

PROGNOSIS

Although the outcome in my case is thus far favorable, the opinion of those who have had a more extensive experience with abdominal actinomycosis is most unfavorable. They do not consider a case cured, until two or more years have elapsed from the time of operation.

TREATMENT

In my patient the treatment was chiefly surgical. I have also had recourse to the much lauded potassium iodide, which I administered in doses of 80 to 90 grains per day, but without success. For every time that the patient was given potassium iodide the temperature would rise, and on its withdrawal it would invariably return to its former range. Recently radium and roentgen-ray therapy have been advocated, as well as vaccines.

B. S., age 15, was referred to me on June 4, 1918, by Dr. Hymanson, on account of pain in her lower abdomen, from which she had been suffering for nearly three weeks, and which would become aggravated on exertion.

Menstrual history. She began to menstruate at the age of 11 years and 6 months; menstruation was irregular in type, occurring every 6, 8 to 10 weeks. The amount was always profuse, lasting from 6 to 8 days. Her last period had occurred three and a half weeks ago, but the amount was very scanty; the flow had lasted only a few hours. The period preceding the last one was also markedly diminished in amount.

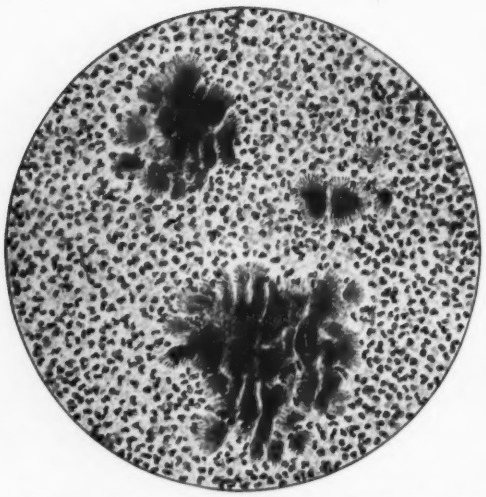


Fig. 2. Ovarian tissue which has undergone complete destruction, the original stroma having been replaced by connective-tissue formation and extensive suppuration. Many groups of actinomyces are found scattered throughout in an irregular fashion.

Previous illnesses. At the age of 8 months she was taken ill with spinal meningitis, resulting in a permanent palsy of the left upper and lower extremities, and an underdevelopment of the entire left half of her body.

The present illness began 3 weeks ago with indefinite pains in the lower abdomen, which gradually grew worse, particularly on exertion. For some time preceding these symptoms, patient complained of general weakness and anorexia. She had no chills or fever.

Physical examination. She presented the appearance of a normally developed girl for her age. The sex organs and the secondary sex characteristics were normal. The underdevelopment of the entire left side of her body, including the left mammary gland, stood out in marked contrast, to that of the right half. Recto-abdominal palpation revealed a semisolid tender tumor occupying the left pelvic fossa. This mass was fixed in position, giving the impression as if it were attached partly to the anterior abdominal wall, and it encroached considerably upon the hypogastric area. The cervix and the uterine body could be felt, but it was impossible definitely to palpate the adnexa. Her temperature was 99° F., pulse 80, and respiration 20. Heart and lungs were negative.

On June 14, 1918, the patient was admitted to the Beth Israel Hospital on my service, and on the following day I performed an exploratory laparotomy.

Operative findings. The mass in the left pelvic fossa proved to be the sigmoid flexure, the mesentery of which was excessively thickened due to inflammatory changes. It was displaced to the right and anteriorly, adherent in part to the abdominal parieties in front, and to the fundus uteri posteriorly. The rest of the pelvic and the abdominal contents were normal in appearance. On attempting to separate the mesosigmoid from its points of adhesion to the left pelvic wall, several necrotic areas were entered, from which a thick purulent material exuded, mixed with necrotic débris. Considering the condition as one of retroperitoneal tuberculosis, I desisted from further manipulations, and after inserting a drain leading to the suppurating focus, I closed the abdominal incision in layer sutures. The pathological report upon the tissue removed for examination was "granulation tissue."

Postoperative course. The patient remained in the hospital for one month, running an almost afebrile course during the entire period. On July 3, 1918, she was discharged, with the abdominal incision healed, except at the lower angle where a small sinus persisted. The diagnosis at this time was still in abeyance.

On December 5, 1918, the patient was readmitted to my service. Her mother stated to me that shortly after the patient's return home, her condition had changed for the worse. The temperature began to rise every evening to 102° and 103° F., accompanied by profuse perspiration, progressive loss of weight, anorexia, vomiting spells, and total amenorrhœa. On examining the abdomen, I found that the laparotomy scar had broken down in several places, from which pus was exuding. Probing revealed several sinuses, some of them subcutaneous others leading to much deeper levels into the abdominal wall. One of these sinuses extended into the abdominal cavity to a depth of nearly 5 inches. The temperature was 101° F., the pulse 120, the respirations 28. The blood examination showed an hæmoglobin index of 60 per cent, red blood-cells 3,600,000, white blood-cells 21,000, polymorphonuclears 78 per cent.

On December 10, 1918, under gas oxygen anæsthesia I explored these sinuses and found in one of them a piece of gauze measuring 1 by ½ inch in diameter. After removing the foreign body I curetted quite vigorously the deeper sinuses and laid open the superficial ones, packed them and returned the patient to her bed. I expected that from now on her condition would improve, but instead the suppuration became more and more profuse, the temperature continued to run a still higher course, and her general condition grew steadily worse. A re-examination by the recto-abdominal route proved that the pelvis contained several indefinite tumor masses, so I decided to reoperate.

On January 9, 1919, I reopened the abdominal cavity through the original incision. The omentum was found adherent to the lower half of the abdominal wall, and to the pelvic contents. After separating the omentum from the underlying structures,

Fig. 3. Cross section of fallopian tube, showing acute inflammation and clumps of actinomyces within its lumen.

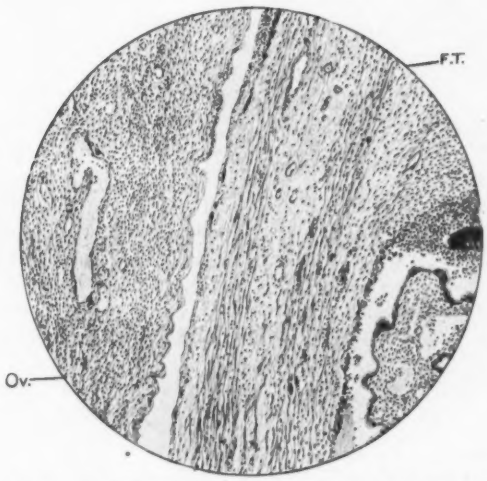


Fig. 4. Section containing besides part of the fallopian tube, *f. t*, also a remnant of ovarian tissue, *ov.*

the uterus came into view. The fundus was fixed to the parietal peritoneum in front, and to either side of it, a globular or rather kidney-shaped tumor, the size of a fist, was present. Each of these tumors was invested with a distinct grayish looking serous covering, and in spite of the fact that they were intimately adherent to the surrounding structures, I succeeded in removing them *in toto*. What struck me as rather unusual, during the operative procedure, was the fact that, although these adhesions were dense and apparently well organized, very little bleeding followed their disintegration. There were very few blood-vessels, indeed, that required ligation. Before inserting my drains, preparatory to the closing of the abdomen I orientated myself upon the fact that, besides the uterus, no other internal organ of generation was left in the pelvis. Her postoperative course for the first week was rather stormy; thereafter, however, she began to improve and on February 22, 1919, she was discharged apparently cured.

PATHOLOGICAL REPORT

Gross appearance. The tumors are about equal in size, measuring 3½ by 2½ by 2 inches and in contour resemble the kidneys (Fig. 1). They are grayish yellow in color and each of them has a smooth glistening serous capsule which can in part be peeled off. On cross section the surface presents an uneven wavy appearance, consisting of trabeculæ, inclosing in their meshes numerous miliary abscesses. The slightest pressure exerted on the periphery of the tumor causes droplets of thick pus to come to the surface.

Microscopic description. Sections were taken from different parts of the tumors, hardened, and stained with hæmatoxylin-eosin, and also with Gram-Weigert. The microscopic appearance obtained was that of tissue which has undergone complete suppurative degeneration. The masses of necrosis, which consist of débris, pus cells and round cells, enclose many hyaline clumps of numerous threads, which radiate from a center, in a fanlike manner, with club shaped extremities (Fig. 2). To establish definitely the identity of the organs removed, additional sections were made, and fortunately I obtained cross sections of the fallopian tubes, which in the gross specimen could not be recognized, on account of their intimate adhesion to the tumor. These sections show that the tubes are in a state of acute inflammation. The mucosal folds are markedly hypertrophied, the stroma is infiltrated with round and pus cells. The columnar ciliated epithelium is wanting in many places, and within the tube lumina masses of necrotic material are found, which surround clumps of actinomyces (Fig. 3). Other sections also show remnants of ovarian stroma, as seen in Figure 4. I was also able to find in some areas remnants of atretic follicles.

CONCLUSIONS

1. The microscopic study proves beyond a doubt that the tumors removed from our patient are the ovaries and the fallopian tubes.

2. The involvement of the mesosigmoid only, as was found at the time of the first operation, leads us to believe, that the primary focus was the lower bowel.

3. The affection of the internal generative organs, as proved at the second operation, six months later, excludes the possibility of a primary genital infection.

4. The location of the actinomyces colonies, both within the tube lumen as well as deep in the ovarian stroma, and not immediately beneath the germinal epithelium or upon it, speaks for the possibility that the spreading of the infection has proceeded both by continuity and by the blood stream.

5. The absence of enlarged retroperitoneal, mesenteric, and inguinal lymph glands at both operations, and since operation, excludes the lymph current as a carrier of actinomycotic infection.

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RUPTURED UTERUS OCCURRING TWICE IN THE SAME PATIENT

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BECAUSE of the unusual interest, I would report the history of a case in which rupture of the uterus occurred twice.

Mrs. J.C., colored, age 27, came to the Stock Yards Clinic of the Chicago Lying-In Hospital and Dispensary at the sixth month of her pregnancy. She gave the following history at that time. Her father and mother were living and well. She had no sisters or brothers. She had had rickets when a child. She did not walk until 5 years of age. She had scarlet fever at 26.

In 1913 she was operated upon at St. Luke's Hospital for threatened rupture of the uterus. The uterus was found to be intact and the baby lived for 2 days. A classical cæsarean section was done. On July 27, 1915, she went into labor for the second time. This time a diagnosis of ruptured uterus was made and another classical cæsarean was performed at St. Luke's Hospital several hours after labor began. The baby was dead before operation. She made a good recovery.

The patient's periods began when she was 16. They were of 4 days' duration, 28-day type, with no pain. The last period was in January, 1918.

On examination it was found that she was six months' pregnant. Her blood pressure and urine were normal. Her pelvic measurements were: spines 26.5, crests 27, trochanters 31, baudelocque 16.5, conjugate diagonalis 7. The promontory was very easily felt. The vaginal opening was very small, admitting two fingers with difficulty. The tubera ischii were close together. The exact measurement was not taken.

The patient complained somewhat of pain in the site of the old scar but otherwise was normal. She reported twice later for examination and everything was found to be going on normally. She was instructed to report at Provident Hospital on the first of September to remain until she started in labor. She did not do as she was instructed.

On September 21, at 7 a. m., she began to have pain in the lower abdomen which was cramp-like in character and about a half hour apart. At 4 p. m., the pains became worse and she could hardly walk. She had one sharp attack of pain, but she did not remember when the rupture took place. She thought she felt the baby move late in the afternoon and even ing. At 6 p. m., she decided to go to the hospita as she thought she was in labor.

On entrance at 9 p. m., the patient showed evidence of abdominal hæmorrhage. The face was pallid, the pulse small in volume and rapid. The abdomen was distended and very tender. It was impossible to palpate anything. No fœtal heart tones could be heard. The presentation could not be made out. She was having pains about 3 to 5 minutes apart. There was no vaginal discharge. A diagnosis of ruptured uterus was made and the patient prepared for operation.

At operation the usual abdominal incision for classical cæsarean section was made. Free blood was encountered as soon as the abdomen was opened. Clots were also seen. There was a dense adhesion between the old abdominal scar and the uterine scar. The adhesion was made up of omentum and sca

tissue. This was severed and the uterine scar came into view. The rupture was located in the old scar and was about 8 centimeters long. The placenta filled the gap. It was covered with blood clots. The hand was passed through the placenta to the sack which was intact. The child was in breech presentation, back on the left. Delivery was made in the usual manner and the child was found to be in state of rigor mortis. The head was bent and fixed to the left. The uterus contracted down nicely. The placenta was delivered, followed by the usual poro cæsarean operation. The operation was practically bloodless. The abdomen was closed in the usual manner. A direct salt solution transfusion was given. Patient was pulseless for a short time but soon revived. She was put to bed in fair condition.

She ran a stormy career for about 6 weeks. During this time a rather large abscess developed in the pelvis on the right side and also a severe bronchitis. There was a marked infiltration of both apices, so much so that an internist made a tentative diagnosis of pulmonary tuberculosis.

The abdominal abscess opened through the lower end of the abdominal scar and through the cervix. Three days later, the temperature dropped to normal and patient went on to recovery. She was discharged from the hospital 9 weeks after the operation. Examination made four months later showed the abdominal contents to be normal. The patient had gained in weight and was doing nicely.

The last examination was made in April, 1919. At that time the pelvis was found empty. No trace of the old abscess was found. The patient was doing light housework without difficulty.

ABRUPTIO PLACENTÆ ASSOCIATED WITH SPONTANEOUS RUPTURE OF THE UTERUS

With Report of Two Cases

By LOUIS E. PHANEUF, M.D., Boston

IN searching through the recent literature for any reference to cases of premature separation of the placenta associated with spontaneous rupture of the uterus, for my own information, I was unable to find any mention of this condition. In the course of 13 months two such cases have come under my observation, and seem to be of sufficent scientific interest to make them worthy of report.

Case 1. Mrs. M. P., para-I, age 33; married 10 months; confinement expected April 15, 1918. The patient was seen in consultation with her family physician at one of the local hospitals March 3, 1918.

The family and previous histories were negative, and the patient was well throughout her pregnancy up to the present time. In the afternoon of March 3, 1918, she rode in the street cars, the jolting there received causing her to start bleeding. The first signs of hæmorrhage were noticed at 5:30 p.m. She was first seen by her physician at 7:30, and taken to the hospital directly. I personally saw the patient at 8:30 the same evening.

On examination she showed signs of marked exsanguination; the pulse was rapid, thready, very poor in quality, and at times was felt with difficulty. The patient was blanched and in extreme shock. The uterus was firm, tense, painful to palpation, and the size of a large term pregnancy. There was no dilatation of the cervix, labor pains were absent, and the fœtal heart tones were not heard.

Because of the marked hæmorrhage and the lack of dilatation of the cervix, it was decided to perform a laparotomy.

Operation. Under light ether anæsthesia, the abdomen was opened by a four-inch incision using the umbilicus as a mid-point, the incision being made on the left side. On opening the peritoneal cavity, considerable bloody fluid gushed out, the incision was enlarged downward, and the uterus found ruptured in the median line halfway between the cervix and the fundus. The rent was through the peritoneum and muscularis but not through the endometrium. The rupture covered an area about 2 inches in length, and the patient was bleeding freely into the peritoneal cavity from this.

Since the tear was longitudinal and in the median line the endometrium was incised over the ruptured area, and the incision in the uterus enlarged upward. A small stillborn female fœtus corresponding in size to about a seven and a half month pregnancy was delivered by breech extraction. The uterus was filled with large clots which were removed. Half the placenta was separated; this was quickly removed together with the membranes. The presentation was cephalic; the position was not made out. The uterus was sutured in two layers; the first interrupted including serosa and muscularis but avoiding the endometrium, the second a continuous Lembert suture including the peritoneum

and part of the muscle and covering the deep sutures. No. 2 chromic catgut was the suture material used. The abdominal cavity was freed of blood clot and liquor amnii as much as possible, and the abdomen closed in three layers with iodized catgut and silkworm gut. Two millimeters of pituitrin were used; one with the skin incision, the other after emptying the uterus. The time consumed in operating was 27 minutes, the amount of ether used, 4 ounces.

The patient's pulse was hardly perceptible during the first part of the operation. However, it improved in quality when the bleeding was controlled. She made a quick, and good ether recovery, was given subpectoral salt solution, the Murphy drip, and morphine in small doses to overcome her restlessness.

From March 4th to 6th the patient's condition was precarious, with paresis of the bowel but without temperature.

March 7, 1918. At 9 a.m., the temperature was 97°, pulse 124, distention marked, patient much weaker. She was at this time taken to the operating room where the silkworm gut stitches were removed. It was found that, on account of the distention, the fascia and the peritoneum had separated underneath the skin which had healed. Both the small and the large intestines were enormously distended, but there were no signs of peritonitis. Under local anæsthesia an incision was made in the right flank and the distended cæcum was brought up, pursed-stringed with No. 2 iodized catgut, opened, and a Mixter tube fixed in it. There was free drainage of liquid bowel content which relieved the distention. The first incision was closed with through-and-through silkworm gut. The patient was at this time transfused by the citrate method from her sister, 750 cubic millimeters of blood being given; she rallied during the day. At 8 p.m. the temperature was 102°, and the pulse 128. There was no change during the night.

March 8, 1918, at 6 a.m., the patient gradually grew weaker, and died at 9:30 the same morning.

This case was almost hopeless from the start, and yet the patient reacted to treatment so well the first two days that hopes of saving her life were entertained. With the onset of the distention nothing which was done in the hope of overcoming it proved of any permanent value.

CASE 2. Mrs. A. K., para-I; married 11 months; confinement expected about April 25, 1919. Admitted to my service at St. Elizabeth's Hospital, April 26, 1919. The family and past histories were irrelevant. The menstrual history was normal.

The patient was admitted to the hospital at 9 p.m., having moderate pains; her pulse was 68. At 3:45 a.m., April 27, 1919, I was notified that she was bleeding slightly, and that her pulse was 90 and of good quality. The fœtal heart had not been heard. I saw the patient at 4:45, an hour later, and her pulse was then 120, thready and of poor quality. She was bleeding freely *per vaginam*. The uterus was tense and tonic. On vaginal examination the cervix was not taken up. There was no dilatation, and the vertex was presenting in left occipito-anterior.

An immediate abdominal delivery was decided upon on account of the hæmorrhage and the long rigid cervix without dilatation.

Operation. Ether anæsthesia. A median supra-umbilical incision about 4 inches long was made. On opening the peritoneal cavity a rent about 2 inches long running obliquely from the fundus toward the right tube was noticed, this extended through the serosa and muscularis, but not through the mucosa. The uterus was incised in the median line, there being practically no bleeding from the cut uterine wall. The placenta was practically all separated. A small stillborn fœtus at term was extracted by the breech, the placenta, membranes, and clots were removed, and the cervix dilated from above. The uterine incision was sutured in two layers with No. 2 chromic catgut. The first layer was interrupted and took in the serous and muscular coats avoiding the mucosa; the second layer consisted of a continuous Lembert suture which took in the serosa and a little of the muscle, and covered the first row of interrupted sutures. The rupture in the uterus was repaired with figure-of-eight sutures of No. 2 chromic catgut. No attempt was made to remove the blood or fluid from the peritoneal cavity. The abdomen was closed in three layers using iodized catgut and silkworm gut. The time consumed in operating was 30 minutes.

The patient made a good ether recovery. She was given 800 cubic millimeters of salt solution under the breasts, as well as a shock enema. The Murphy drip was started as soon as she was returned to her bed, and she was given enough morphia to keep her quiet. At 4 p.m. the pulse was 120, and of decidedly better quality.

April 28, 1919, the morning temperature was 99°, the pulse 120, and of good quality. The patient looked better and felt better. A high compound enema was given in the afternoon. On May 2, 1919, the evening temperature was 102° and the pulse varied from 90 to 100. The abdomen was soft, there had been no distention, and the bowels had resumed their natural function. Soft solid diet was ordered. May 11, 1919, the patient was gaining in strength rapidly, the temperature ranged from 101° to 100° in the evening, and was normal in the morning; the pulse varied from 80 to 90. She was allowed to sit in a chair for short intervals. May 16, 1919, the evening temperature varied between 100° and 99°; otherwise conditions are normal. May 23, 1919, the temperature has remained normal for some days and the pulse is 80. *Discharge note.* The abdominal incision is well healed throughout; no induration or tenderness. Vaginal examination shows the cervix closed, the uterus well involuted and in position, the adnexa normal and the parametria non-sensitive.

May 23, 1919, discharged well on the twenty-sixth day after operation.

TEMPORARY STERILIZATION OF THE FEMALE

By Dr. AUGUSTO TURENNE, Montevideo, Uruguay
Professor of Clinical Obstetrics, Montevideo Faculty of Medicine

THE voluntary limitation of procreation is a problem which no doctor can afford to neglect at the present time. The evolution of customs, the progress of social organization, the profound changes which take place in legislation, the modification which a multiplicity of factors impress on the constitution of the family, make necessary the profound consideration of means for bringing into accord interests which appear to be diametrically opposed, without departing from the capital precepts of professional morality.

Neo-Malthusianism, even in its excesses, shows the necessity for studying its origin, its development, the means of combating its extreme views, and more than all, of delving into it for the secret but irresistible cause to which is owed the diffusion of the practices which constitute its application.

It is for these reasons that I believe we ought preferably pay attention to the means, which upon previous mature reflection, we should advise in particular cases.

The disadvantages of the anticonceptional practices most frequently used have been largely studied, especially by the European anti-Malthusians, who for the most part mask nationalism and an aggressive militarism with abundant verbiage about an apparent high morality. There is no doubt, however, that the violation of the natural laws of copulation, of which coitus interruptus is the type, brings on serious danger of nervous inequilibrium in both sexes and such psychic disturbances as the unfortunate Professor Bossi has described with singular mastery, although perhaps in a manner unduly detailed. The use of substances fatal to the spermatozoa is impracticable, especially in the customary mode of conjugal life; and mechanical means of cervical occlusion, in particular the intra-uterine pessary, are dangerous, often giving rise to uterine cancer, in the etiology of which traumatism and infection seem to be preponderantly important, and this is brought on by the trophic epithelial deviation with a rigid stem which permanently irritates the mucosa. Most men find it difficult to use a condom. Aside from the indications of the interested individual order to which the physician ought not to listen, there remains a group of indications for which the occasion for sterilization of the female can be considered.

The progress in pathology and obstetric technique daily reduces their number, but aside from irreparable or definite situations, there exist circumstances in which an affection, susceptible of contra-indicating pregnancy or childbirth temporarily, is cured, or rather the contra-indication disappears. Nor must the cases be forgotten in which a marital psychosis can justify a temporary sterilization which would have no reason for being in the event of the death of a sick husband or in case of divorce.

The procedures which have been used heretofore have the disadvantage of sterilizing permanently, and when they have not done so it ought not to be laid to the operator; to these last belong ligation and simple section of the tube. More radical are tubal resection between two ligatures, resection of the proximal tubal end and a wedge out of the cornu of the uterus, the resection of the ostium with a piece of the tube and its inclusion between the layers of the broad ligament, and the extraperitoneal fixation of the tube in the inguinal canal of the round ligament. While these procedures produce definite mechanical sterilization, they are accompanied, with relative frequency, by degenerative disturbances of the ovary; no insignificant matter if the capital endocrine function of this organ is taken into consideration (Bordé, Mandl, Buerckadt, Kehrer).

Every procedure for temporary sterilization should, according to our opinion, meet the following requirements:

1. It should be easy of execution.

2. It should reduce to a minimum the danger to the life of the patient.

3. It should avoid producing degenerative lesions of the ovary.

4. It should not modify substantially the nutrition, the topography and the functioning power of the different segments of the genital apparatus.

5. It should permit of the re-establishment of cervico-ovarian communication.

The first mention of a possible temporary sterilization, exclusive of roentgen actinotherapy, with excessive or ineffective results, I have found in the experimental work of Professor Taddei, of Florence, published in the *Annali di Ginecologia e Osletricia*, 1908 and 1909. In two successive notes this author relates the results of the peritoneal exclusion of the ovary in rabbits. This same year, 1909, Dr. Paná, assistant at the surgical clinic of Florence, published in the same journal a brief note on the technique of this operation in women. Both authors, on investigating the integrity of the germinal epithelium after a number of months of inclusion (at least in the rabbits) were able to point out the probability of a subsequent liberation with a possible later conception; however, neither of them made mention of such an occurrence. Neither did they cite clinical cases.

The objection which has occurred to me to the Taddei-Paná procedure is that the ovular occlusion in women might be accompanied by a hæmorrhage of variable quantity, but which sometimes might give rise to perceptible exudates, even up to peritoneal inundation. In these conditions, and the absence of clinical documents authorizes the doubt, I believe lies the possibility of the formation of small encysted intraligamentous hæmatomata, and as a consequence, painful premenstrual disturbances.

From the reading of the works to which I have alluded, it is given out also that the necessary section of a piece of mesosalpynx provokes, even without intraligamentous inclusion, endo-ovarian circulatory disturbances. It is reasonable to think that these disturbances should be reflected in the trophism of the gland, provoking, very probably, modifications in its internal function.

It occurs to me, starting from a basis analogous to that of Taddei-Paná, that one could accomplish an intervention on the tube, which, while occluding it effectively, would leave (a) the rest of the tubal canal permeable; (b) the tubo-ovarian peristalsis intact; (c) the approach of these two organs easy, salpyngostomy having been done in the ampullar region.

In a woman whose four former pregnancies had been progressively more difficult, there had been present a pyelonephritis which apparently became cured in the intervals between pregnancies but reappeared during each one of them, demanding vigilance and very severe treatment. In the last two pregnancies, the softening of the pelvic articulations compelled the patient to remain almost immovable during the last months. In 1916 she presented metrorrhagias due to retroversion of the uterus, slightly reducible; a suitable pessary could not be tolerated. I proposed then a surgical operation and she consented, but as she had to go some distance away from home and did not resign herself to the risk of a pregnancy away from her own family physician, she consulted me concerning the advisability of taking advantage of the curative operation for the retroversion in order to do a sterilization. I explained in detail to her and her husband the consequences, and as they were economically so situated that they could face without anxiety the coming of other children, they accepted my proposal to do a temporary sterilization.

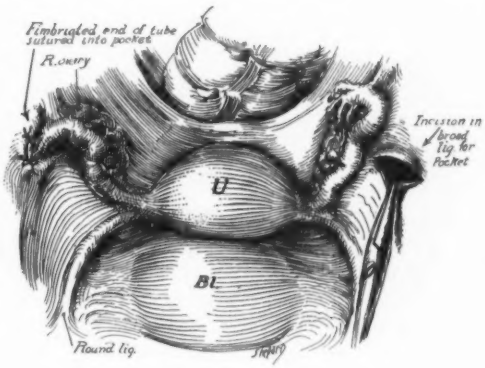
I operated upon the woman according to the technique described below, in October, 1916, and according to the most recent advices, her health is entirely normal. Later, I operated upon three other patients under the same conditions; two of the cases (one on my service at the Maternity Hospital, the other in private practice) are too recent upon which to base definite conclusions; the third one is making good progress.

TECHNIQUE

The operation is done with the patient under general anæsthesia—morphine-kelene-ether. The patient is placed in the Trendelenburg position; and the Pfannestiel's incision

used. The pelvic and abdominal organs are explored, and if necessary operations on the adnexa and appendix performed. After the integrity of the adnexa is established, or if the lesions are extremely small (microcysts, small adhesions), we proceed holding the broad ligament with two hooked forceps in a way to present amply its anterior surface; 10 or 15 millimeters from the lower tubal border and near the ostium we make a 15 or 20 millimeter incision in the anterior layer of the broad ligament; we separate the edges of the incision and hollow out in the cellular space which separates the two layers of the ligament a little pocket sufficient to contain the tubal ostium. This we fold in and suture; for greater security it is fixed to the ligament at a separate point near the tube. This organ retains sufficient mobility, it is not violently kinked and prolonged observation does not show any circulatory disturbance of any sort. With this technique, one can be certain of being able later to do with ease a salpyngostomy and to adjust the opening to the ovary as in the classic salpyngo-ovaropexy. The abdomen is closed by peritoneal and aponeurotic suture, intradermic cutaneous suture, or with clips.

The operation is easy to do, and in my judgment, a rational procedure, which serves the double purpose of a permanent or a temporary sterilization if the occasion for a new pregnancy without risk should reappear. There is lacking in my work the experimental work on animals, but one of the modes of genital function in the human species, menstruation, is so peculiar to it that the results of the intervention could not be compared. Postoperative clinical control, and later, when occasion presents itself, the observation of a woman during a new conception, and the inspection and histologic examination of portions of the organs, will be the final proof of the efficacy of the operation.



U, uterus; *Bl.*, bladder.

The technique which I use is very simple, and I believe original. I do not pretend to have searched through all the voluminous gynecological literature of the last fifteen years, but in examining the books which I have been able to consult I have found no reference to it.

Without pretension then to originality, I can at least affirm that I have no knowledge that in our gynecological practice the technique which I have described has been thought of or used.

TORSION OF THE SPERMATIC CORD

Report of Two Cases and Review of the Literature [1]

By VINCENT J. O'CONOR, M.D., Boston

TORSION of the spermatic cord is reported in 124 instances in the literature. Scudder, in 1901, collected 31 cases and added one; Dowden, in 1905, discussed 37 cases, and Rigby and Howard, in 1907, found 40 cases reported. After carefully reviewing the subject I believe that torsion is probably more frequent than would appear from the number of cases reported. The conception of the etiology of this condition and the proper manner of subsequent treatment seems at wide variance among these authors and a résumé of the literature is very interesting if not instructive.

Two clearly defined varieties of torsion of the spermatic cord occur: the acute type and the recurrent type. This distinction was first emphasized by Perry. The acute type is usually recognized because it becomes progressively more painful and is ultimately operated upon. The recurrent type may very easily go unrecognized, the diagnosis of orchitis or epididymitis being made. During a subsequent attack which does not quiet down so readily the correct diagnosis may be made.

ETIOLOGY

Torsion may occur at any age. Taylor reports a case present at birth, Dowden at 5 months, Howse at 48 years and Lexer at 60 years. The average for all cases was 13 years and 4 months. The majority of acute cases were seen just before or at the age of puberty. Pearce Gould has described a true venous hypertrophy in the cord at puberty, while Davis-Colley and Spencer also refer to an increased vascular arrangement in connection with the testis at this period of life. All three of these authors felt that this was an important etiological factor in the occurrence of torsion at this age.

In 70 instances the torsion occurred on the right, and in 54 on the left. As is well known the predominance of undescended testes is also on the right.

Fifty-two cases occurred in fully descended testes and 72 in incompletely descended. Torsion occurred in 3 instances in interabdominal testes.

Lauenstein believed that torsion occurred because of an abnormally broad and flat cord with what he terms "a long mesorchium" and which he describes as a "floating testicle." Corner makes a like report and describes the condition as a "movable testis."

Dowden after operating on 5 cases of recurrent torsion believes that the etiology lies in a faulty development resulting in an intermesorchial separation of the cord, so that the testis is more horizontally placed, and the vessels, as a result, are drawn away from the vas deferens by the descending globus major.

Rigby and Howard, after careful study of nine specimens, conclude that in every instance the testicle must be attached to the spermatic cord in some abnormal way, that there is an abnormal attachment of the common mesentery and vessels to the lower pole of the body of the testis and globus minor, so that the testis is attached by a narrow stalk instead of a broad band. They also found an elongation of the globus minor and an abnormally capacious condition of the tunica vaginalis. Uffreduzzi states that a testis normal in its attachments can not undergo torsion. Lexer and Nicolandi made similar observations.

Curling considers the chief factor to be the defective formation or abnormal attachment of the middle strand of the gubernaculum, so that as a result there is no fixation of the lower portion of the testis to the scrotum.

Uffreduzzi believes, however, that the torsion is always brought about by contraction of the cremasteric fibers. His deductions are very clear and the most logical ones advanced, and seem to account for the variance of type and degree perfectly. There must be an abnormal attachment of the testis and a certain deficiency in make-up of the

[1] From the Urological Clinic of the Peter Bent Brigham Hospital, Boston.

gubernaculum associated with a more or less capacious tunica vaginalis. This anatomical variation would not result in torsion, the twist itself resulting from repeated contraction of cremasteric muscle bundles, strands of which are anomalous. Therefore, the degree of torsion, that is the number of half turns or full turns the cord undergoes, depends indirectly upon the freedom of the testicle to be rotated inside the tunica and directly upon the strength of the muscular contraction. Johnson has made similar observations concerning the contraction of the cremasteric fibers.

Torsion most commonly came on during sleep but instances are given where strain, rapid walking, coughing, crossing the legs, etc., was the exciting factor. Gradual and repeated strain was more often noted in the recurrent cases; as coitus, and defæcation.

PATHOLOGY

The cord above the torsion contains either dilated or flattened and partially obliterated spermatic veins, depending upon the extent of their occlusion in the twist. The spermatic artery is always greatly dilated but usually pervious. If the case is an acute one, the surrounding tissue is œdematous; if chronic it is adherent and fibrous. In the acute cases the twist occurred from without inward in over two-thirds of the cases. Lauenstein referred to this in his cases and quotes Kustner's similar experience in torsion of the ovarian pedicle. In the recurrent cases no rule can be formulated.

The extent of the twist varies from one-half turn to two full turns and the site of the twist is always in that free portion of the cord which, covered by tunica vaginalis, suspends the epididymis and testicle.

Incision into the tunica vaginalis reveals more or less blood-stained fluid in the early stages while in the longer standing process it is entirely filled with old blood clot. The remainder of the cord below the twist, including the epididymis, is greatly swollen and bluish or purplish in color, while the spiral intersections produced by the twist are clearly seen. The testis may be only slightly enlarged or it may be double the normal size.

On section the parts show intense engorgement, red, blue or black depending on the duration. In the longer standing cases there is a destruction of the testis, not a necrosis in the ordinary sense of the word but an aseptic death of the gland, which in process of time undergoes fibrification and consequent atrophy if left in the scrotum. In the recurrent cases any sharper attack than usual may cause lymph to be deposited in the tunica vaginalis and form adhesions anchoring the testicle. Microscopically there may be seen hæmorrhagic infarction; no organ left but merely old blood clot; or a diffuse interlobular hæmorrhage.

SYMPTOMS

The onset occurs with a varying degree of pain in the lower groin of the affected side. In the cases which do not subside the pain becomes progressively more severe and localizes in the testis and lower cord.

Swelling of the scrotal contents begins immediately and, in the majority of cases, after 24 to 48 hours, ceases to increase. Lexer, however, reports a case in which the scrotal content gradually enlarged to the size of an infant's head. The swelling involves the cord to the degree of the height of the twist, and the scrotum becomes diffusely reddened and tense, or in the case of a testis lying high up in the inguinal canal, the superficial structures of the groin assume this appearance. The outline of the testis and epididymis soon becomes obscured and the swelling has the appearance of being drawn upward in the scrotum or inguinal canal, due to the shortening produced by the torsion.

Nausea and vomiting frequently follow the onset of pain and in very acute cases a general weakness and malaise is present.

There will be very slight general reaction in the majority of cases and the temperature, pulse, and leucocyte count will not account for the severity of the local condition.

Stiles reports a case where frequency of urination was the most prominent symptom and Rigby and Howard found difficulty of urination in three cases. Dowden reported œdema of the scrotum as an important sign but others note the redness and swelling as characteristic without œdema.

Edington describes a case in an infant aged 7 months in which there was no pain or tenderness.

If no attempt is made to untwist the torsion there is usually a slight subsidence of all pain after a week or ten days, but the swelling and a local tenderness persist. In a very small percentage of cases, gangrene will eventually set in; the usual sequel is a gradual atrophy due to fibrotic changes in the testicle.

DIAGNOSIS

Epididymitis may be ruled out by the history, examination of the urine, and rectal palpation of the prostate and seminal vesicles. Orchitis will be differentiated by the character of the swelling, the high position of the testis, involvement of the cord, and absence of history pointing to etiology.

Hydrocele, fibroma of the cord, acute ruptured varicocele, or lymphadenitis of the horizontal chain of glands can be readily ruled out. Strangulated hernia or incarcerated omental hernia are frequently diagnosed or are ruled out only with great difficulty. If the testis is absent from the scrotum, the former conditions can be ruled out with greater ease, but the differentiation from hernia is more difficult. A coincident Richter's hernia can hardly ever be entirely excluded as a possibility.

The redness of the scrotum, the elevation of the testis and the limitation of swelling to the lower inguinal canal are all important. Carefully studied cases may be doubtful until operation, especially in the acute cases occurring where the testis is situated high up in the inguinal canal. Whipple and Nash report a case where the vomiting became stercoraceous, and a definite diagnosis of strangulated hernia has been made in over half of the cases where the vomiting was present. Cupler reports a case of strangulated right interabdominal testis with symptoms simulating appendicitis.

Stanton and Shaw and Golding have reported cases of inflamed appendices adherent to the testis in the tunica vaginalis in which the pre-operative diagnosis was in doubt, but in these rarer conditions the swelling is practically never confused with that of torsion.

PROGNOSIS

In recurring torsion the attacks will continue and will probably result in a varying degree of atrophy accompanied by neuralgic pain unless an orchidopexy is performed. Some few cases have had no recurrence after the first manipulation to untwist the cord, but these were always in cases seen and recognized in the early part of the first attack.

In the acute cases with marked symptoms there is usually no relief for a long period of time except by manipulation or operative interference. So far as recorded torsion of the spermatic cord has never proved fatal.

TREATMENT

1. *Detorsion* has been successful in a few cases of torsion in fully descended testes when seen very shortly after the onset of symptoms. It should, therefore, always be attempted in cases seen early but only in those where the testis is outside the external abdominal ring. It is obviously impossible where the strangulation has existed long enough for engorgement of the testis to occur, or for much fluid to accumulate in the tunica vaginalis.

Detorsion is accomplished by grasping the testicle between the thumb and second finger and slowly rotating on the vertical axis, first trying from within outward as the torsion most often found has occurred in a counter-clockwise direction. No force should be used and torsion should be continued until relief is felt or pain and resistance become so severe that it is obviously the wrong direction.

In one instance a patient with recurrent torsion was taught to perform detorsion successfully upon himself for many years. However, if after a successful detorsion has been accomplished, the condition recurs an orchidopexy is immediately indicated.

Perry reports a case recurrent every two months for two years, and Dowden had two cases recurring frequently for ten years. During this time atrophy of the testis occurs and operation is practically always resorted to eventually before a lasting relief is obtained.

It is always unwise to attempt detorsion

in an undescended testis and, because of the impossibility of ruling out coincident hernia, operative interference is always immediately indicated in these cases.

2. *Orchidopexy* should be performed in all cases where it is deemed advisable to save the testis and where there is no anatomical condition present that will interfere with the success of the procedure.

The usual transposition can be done on undescended testes with satisfactory results. In fully descended testes any operation that performs and accomplishes a fixation preventing recurrence will achieve a cure. A simple eversion and suture of the tunica vaginalis is usually sufficient.

3. *Orchidectomy.* In an adult where transposition of the undescended testis cannot be satisfactorily accomplished, or in any case where necrosis, gangrene or persistent circulatory obstruction is present. removal of the testis and the involved portion of the cord is indicated.

CASE 1. Patient E. W., a riveter by occupation and aged 31 years, presented himself at the Peter Bent Brigham Hospital giving the following history:

He had gone to bed two weeks before feeling perfectly well, but on waking in the morning had a severe dull pain in the right testicle. He noted that the scrotum was slightly swollen and very tender to palpation. Otherwise he felt well. He remained at home during the day and called his family physician who told him he had "inflammation of the testicle" and advised him to remain in bed with the scrotum elevated. Cold cloths were applied constantly but the swelling and pain gradually increased during the day and the scrotum and right groin became hot and reddened. Morphia was required to ease the pain at night. The pain continued to be very severe for three days and then gradually became less disturbing, but the swelling persisted although it did not increase after the second day. The skin remained reddened and the right scrotum and groin were still very tender to palpation when the patient presented himself for examination. There had been slight anorexia but no nausea or vomiting. The bowels had moved daily as usual and urination had been normal. The patient came to the hospital because he felt that he was not improving. He claimed to have lost 10 pounds since the onset of the trouble.

Admission temperature, pulse rate and respiration were normal. Blood examination showed 90 per cent hæmoglobin, 14,000 leucocytes, 4,250,000 erythrocytes. Urinalysis was normal.

The family history was of no importance. He had had the usual diseases of childhood, no previous accidents or operations, and an attack of gonorrhœal urethritis ten years before without subsequent symptomatic complications. He denied syphilis or chancroidal infection. No cardio-respiratory, gastro-intestinal or neuromuscular complaints.

The patient remarked that the right testicle had always been situated high up in the scrotum, but that since the onset of his trouble it seemed to have been drawn up even more than formerly.

Physical examination showed a well developed and nourished man, normal in every respect except for his local condition in the right groin and testicle. There was no spasm, rigidity or tenderness over any part of the abdomen except in this region, and there was no visible peristalsis noted. The skin over the right inguinal canal and right testicle was of a dark reddish blue color and only slightly tender to palpation. Over the external inguinal ring it was adherent to the underlying structures. There was no œdema of the scrotum. In the right inguinal region and extending into the scrotum there was a hard mass connected with the testicle which was held high up as though incompletely descended. The mass could be traced up the inguinal canal to the internal inguinal ring, and so filled the inguinal ring that the outline of the latter could not be palpated. It did not transmit light, was non-reducible and was flat on percussion. The left external inguinal ring, testicle, and cord were normal. Reflexes were normal. Blood Wassermann was negative. The diagnosis of torsion of the right spermatic cord was made.

At operation the spermatic cord above the external ring was normal except that the spermatic artery and veins were double their normal size. No hernial sac was present. At the external inguinal ring the structures surrounding the cord were fibrous and adherent to it. The cord was strangulated by a rotation upon itself in a clockwise direction. The extent of the rotation was one half turn (180 degrees). No gross abnormality of the cord or its attachment to the body of the testis was discovered, except that three prominent strands of cremasteric muscle were reflected low down, their origin being just above the site of the torsion. After freeing the dense fibrous tissue about the cord the normal position of the cord and testicle could be restored by rotating the testicle one half turn in a median direction. Incision into the tunica showed no fluid and no normal testicular tissue, the cavity being filled completely with old blood clot. There was no bleeding upon incising any of the structures below the point of strangulation.

On section, the contents of the tunica appeared as dark red blood in the form of dark red clots, the accumulation being greater in the upper pole of the organ. The epididymis was swollen double its normal size, with considerable dark red blood surrounding it and the normal tissue almost entirely replaced by clotted blood. The spermatic artery

was greatly dilated in its distal portion by a band-like constriction, but was still patent. The spermatic veins were engorged, flattened, and occluded.

Microscopically the vessels of the pampiniform plexus were distended, some of them being ruptured with consequent hæmorrhage into the interstices. There was beginning organization of the various blood clots. Along one border of the sections including the epididymis were many narrow fibers of cremasteric muscle. On account of the massive hæmorrhage into the testicular tissue, microscopical sections could not be cut properly, but the sections obtained showed an extreme congestion and interstitial hæmorrhage of the testicle.

The patient made an uneventful recovery and was discharged in good condition on the twelfth day. Final diagnosis: acute torsion of the right spermatic cord. Operation, right orchidectomy. Result, well.

CASE 2. (Reported through the courtesy of Dr. C. A. Porter.) Patient H. W. R., aged 45 years, contractor, presented himself saying that the day before, while stepping out of his automobile, he felt a sudden pain in the right groin, after which the structures of the cord on this side had become extremely tender. On examination there was marked tenderness and slight thickening of the right spermatic cord but no beading or localized indurations were felt, and there was no enlargement of the testicle. The tenderness to palpation extended down to the epididymis; there was no hernia on the right. No abnormality in the development of the testicle was noted. The urine contained a few shreds but was otherwise negative. The right lobe of the prostate was definitely tender but not palpably abnormal. The patient was directed to rest in bed with an ice bag applied to the right scrotum. Urotropin was prescribed.

Three days later the patient had less tenderness in the cord, but the testicle was somewhat swollen and tender, and in the evening the temperature was 102°. Continued rest with ice bag on scrotum was followed by a return to normal temperature, but no decrease in the testicular swelling. Two days later there was definite induration and enlargement of the whole epididymis and testicle, the former being felt to lie anteriorly instead of posteriorly to the testicle. There was no hydrocele. At this time the diagnosis of incomplete torsion of the right spermatic cord was made, and an attempt at detorsion was made without success. In view of the partial subsidence of both pain and swelling, palliative treatment was continued with entire relief of all symptoms.

Six weeks later the patient was free from pain or tenderness of the right cord, epididymis or testicle. The urine was normal in every respect. The epididymis, however, remained anterior to the testicle, the latter showing an appreciable degree of atrophy. Final diagnosis: incomplete (45 degrees) torsion of the right spermatic cord. Possibly later to be classified as chronic or recurrent). Treatment, palliative.

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URETERAL OCCLUSION: ITS RELATION TO RENAL LESIONS [1]

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URETERAL occlusion is of frequent occurrence, is partial or complete, is sudden or slow in taking place, gives rise to many and varied symptoms, is often unrecognized even for years, and should be eliminated as soon as possible — not only for the relief of the symptoms it causes but for the welfare of the kidneys.

The maintenance of a healthy kidney depends almost entirely upon the amount of work thrown upon it, plus the maintenance of free drainage. The first factor is in direct relation to the general physical condition of the patient; and the latter, to free exit from the kidney tubules to the bladder and sometimes from the bladder.

Too much stress cannot be laid upon the factor of the supply of toxins and bacteria to the kidney; and in this relation the kidney function should be regarded as a terminal process dependent upon the health or pathology, *local* and *collective*, of all the parts of the body, and it should not be studied or treated until a thorough knowledge of the patient's condition, particularly as to the existence of focal infections, has been obtained by all the methods at hand.

When the question of supply to the kidney has been ascertained, a study of the elimination is in order. The first and, to my mind, the most important element in this connection is free drainage. However great the load that is thrown upon the kidneys—primarily from the circulation, secondarily from the lymphatics, and possibly thirdly by direct extension from surrounding viscera—the kidneys will stand up remarkably under the burden if free drainage is maintained.

Sudden, complete obstruction is usually recognized; yet while such cases require much study and surgical judgment for their proper management, it is the cases of long-continued, slowly-progressing or intermittent occlusion, with their consequent kidney changes, that require special study: first, as to the diagnosis of the occlusion; second, as to the proper relief of the obstruction; third, as to the actual amount of kidney change that has taken place; and, lastly, as to the proper course to pursue in future kidney management.

While the ureters are apparently well protected by being deeply placed in the abdomen —shielded posteriorly by the muscles of the back and the bony pelvis; anteriorly, by the peritoneum and its contents—they are particularly liable to pressure from without, since they lie upon a firm bed favoring compression from in front. This is particularly true as they cross the iliac vessels at the brim of the pelvis, the ureters being angulated at the same time. There is also a tendency to angulation at the ureteropelvic junction, and again as the ureters enter the bladder wall.

The ureter is loosely attached in its course but is fixed to a heavy organ (the kidney) above and to the bladder below. The kidney is more or less mobile, and it is easy to see how even slight abnormal mobility may allow a prolapse of the entire ureter, or a kinking or a buckling to take place. Lying in direct contact with the peritoneum throughout most of its course, in its close affinity with the perirenal tissues and with the appendix on the right side, intimately connected with the uterus and adnexa in the female and with the prostate and seminal vesicles in the male, and incorporated in the bladder wall for the terminal 3 centimeters of its course, the secondary involvement incident to lesions of these structures is apparent. To this must be added the fact that the ureter is bathed internally with urine often containing large numbers of bacteria and irritating elements.

The blood and lymphatic supply of the ureters bring them into intimate relation with surrounding organs; and the nerve supply from the spermatic, renal, and hypogastric plexus of the sympathetic system explains the complexity of symptoms and the difficulty in the differentiation of ureteral lesions subjectively.

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In taking up the causes of ureteral occlusion I will mention several conditions which are vesical rather than ureteral but which should be considered in this connection. The first is the presence of a large vesical calculus filling the bladder and causing obstruction at the ureteral orifice; and the second, tumors of the bladder wall in the region of the ureteral orifice. The writer operated upon a case of the former in 1910. The patient entered the hospital in a uræmic state. A calculus was found completely filling the bladder cavity. The removal of the calculus was followed by urinary suppression.

Numerous cases of papilloma of the ureteral margin have been observed. In one instance partial obstruction of the ureter with kidney dilatation was observed; in another, complete occlusion resulted from congestion (a local reaction) when the papilloma was treated with the high frequency spark. Renal colic ensued at once and was relieved in each instance by an indwelling ureteral catheter. A recent case coming under observation presented each ureter occluded by multiple tumors (hypernephromata).

A condition encountered in a series of cases is ureteral occlusion with severe colic due to acute congestion of the prostate. The sudden enlargement of the prostate in these cases, which is most pronounced intravesically, causes a pulling and angulation of the vesical portion of the ureter and back pressure on the renal pelvis. The ureteral orifice is seen opening on top of the prostatic enlargement. The patients observed were all young men, and a diagnosis of impacted ureteral calculus had previously been made in each case. Many of them were sent into the hospital as acute surgical conditions. In none could the ureter be catheterized. In several of these cases there was found a distended seminal vesicle which undoubtedly contributed to the occlusion. All were relieved by local treatment.

A cystic condition of the ureter at its orifice has been noted. This is often difficult to differentiate from a prolapse of the ureter into the bladder. Both conditions have been encountered, causing back pressure upon the kidney. The cystic condition is relieved by incisions, the manipulation being carried out through the cystoscope. Prolapse of the lower ureter into the bladder is usually part of a prolapse of the entire ureter and kidney, most often in cases of general visceroptosis.

A small round ureteral orifice is occasionally seen, and I have always found in these cases polycystic kidneys above. It is possible that this small orifice assists in the advance of the cystic dilatation of the kidneys. Stricture of the ureteral orifice following tuberculous ulceration, the long-continued irritation of a calculus lodged at this point, or manipulation (especially cauterization), is not uncommon. This lesion progresses so slowly that complete destruction of the kidney from back pressure, and possibly added infection, may result before a diagnosis is made. I have been able to divide or dilate strictures located at this point by cystoscopic operative measures.

Spasm of the ureteral wall I have found frequently and, with few exceptions, always in the female. It is noted as soon as the catheter enters the ureteral orifice. The ureter grips the catheter, and the harder one pushes the catheter the tighter it is gripped by the ureteral wall. If the catheter is rotated in the fingers, the ureter coils up with it; and attempts to withdraw the catheter pull the lower ureter into the bladder. The importance of this condition has not been appreciated. It is, I believe, a reflex phenomenon, often diagnosed as stricture. I have found it in highly nervous women, often in ureteral prolapse; also in infections of the urinary tract and in the presence of impacted ureteral calculus. When only the spasm is present it may be the cause of fleeting attacks of kidney pain which cannot otherwise be accounted for. By withdrawing the catheter and inserting another it will often pass without difficulty. The action is quite similar to the spasm often encountered in passing urethral instruments.

I have observed one case of valve formation at the ureteral orifice, resulting in congenital hydronephrosis.

Occlusion of the vesical and pelvic ureter is most often due to impacted calculus. If a calculus leaves the kidney pelvis it may be-

come impacted at the ureteropelvic junction, at the pelvic brim, possibly between these points, or it may pass these limits and lodge in the pelvic ureter, probably at the point where the ureter enters the bladder wall. Few calculi pass through the lower 3 centimeters of the ureter without becoming at least temporarily impacted. Some lodge here intermittently, interfering with kidney drainage; others remain, slowly increasing in size, causing local ureteritis, back pressure upon the kidney, with slow renal destruction and usually renal infection. The number of cases presenting renal tuberculosis, and even renal tumors, coincident with impacted ureteral calculi, gives evidence of the importance of occlusion in predisposing to kidney lesions and the necessity for the removal of the occlusion as soon as the diagnosis is made.

That the vast majority of these calculi will be passed following intra-ureteral manipulation, will be seen by the following figures: Of 212 calculi lodged below the pelvic brim—seen by the writer since 1910—201 have been passed following manipulation, and but 11 have required open operation (ureterotomy). All of these 11 were large calculi and had histories of long impaction. Three cases now under observation may require open operation. It is not always a question of the size of the calculus; more depends upon the length of time since the first colic, the number of colics, the presence of ureteritis, dilatation of the ureter and kidney pelvis above and also the patency of the ureter below. If the ureter is dilated above the calculus and a ureterotomy is contemplated, an examination should be made just before operating, as a calculus impacted low down in the ureter often moves backward. This is particularly true after passing ureteral catheters. In three cases this has occurred in the writer's experience; at operation it was found that the calculus had passed back into the kidney pelvis. Kretschmer reports similar experiences.

Ureteral kinks in the pelvic portion of the ureter may cause obstruction, but these are comparatively rare. I have seen few cases where I felt that this was the cause of the obstruction when the occlusion was in the pelvic ureter. Strictures secondary to calculus, tuberculosis, adhesions, extension of surrounding inflammation, especially from a diseased appendix or pelvic disease, have been frequently encountered. Other strictures, such as those described by Hunner, have not often been found by the writer. There are wide variations in the caliber of ureters, the same as are found in the size of the urethra, and this fact must be borne in mind before a diagnosis of stricture is made.

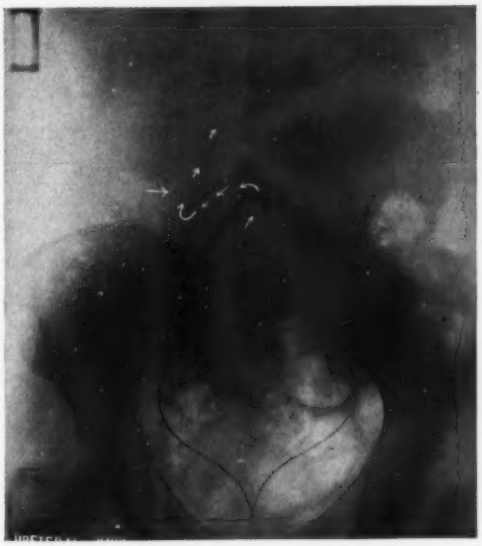

Fig. 1. Kink in the ureter. Pyonephrosis.

A complete occlusion of both ureters was found in one case, resulting from a wide cicatrix following cauterization of the uterine cervix with a Percy cautery. There had been complete retention of urine for 11 days. Each ureter above the point of occlusion, which was close to the bladder wall, was dilated to the size of a thumb. Each ureter was cut off and implanted into the bladder fundus. The kidneys began to functionate at once and the patient went on to a complete recovery.

Not infrequently the lower ureter is injured during pelvic operations and either ligated with the uterine artery or a ureterovaginal fistula results. I have seen one case where each ureter had been twice ligated, and seven other cases in which one ureter was ligated.

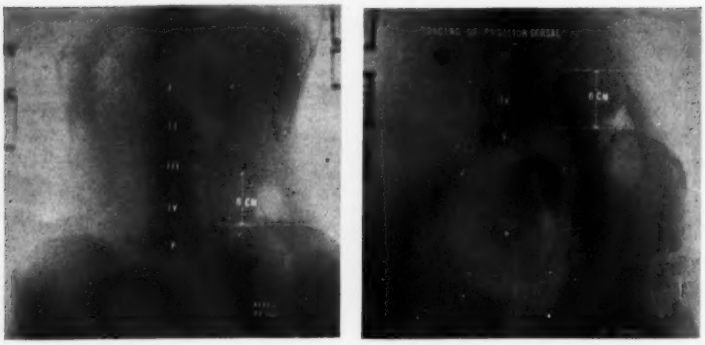

Fig. 2. Method of demonstrating position of kidney—ureteral kink. Roentgenogram at right shows drop of 6 centimeters on change from horizontal (left roentgenogram) to standing position.

In only one case was the kidney destroyed. The diagnosis was made early by passing ureteral catheters. In each instance a second operation was performed and the ligatures removed.

A uterine carcinoma may involve the lower ureter, making it difficult not to injure the ureter in its removal. If it is possible to insert an indwelling ureteral catheter early, this should be done; and the fistula may close spontaneously. If not, an implantation should be attempted, and the sooner the better before the cicatrix has formed.

I have seen two cases of stricture of the ureter at the pelvic brim resulting from ureterotomy. In both instances I was able to dilate the stricture. In a third case, where the constriction was found ten days after operation, a second operation was successful in freeing the ureter and re-establishing its lumen.

Blood clots, plugs of pus, and collections of gravel may lodge in the lower ureter and give rise to violent attacks of colic. In these cases the obstruction is easily relieved by passing ureteral catheters and irrigating the ureteral canal.

Palpation of the lower ureter through the vagina and rectum should always be attempted. An enlarged, tender ureter may often be an early diagnostic point in renal tuberculosis, or a calculus detected by the examining finger.

Above the pelvic brim, the most common cause of ureteral occlusion is a kinking of the ureter, most often due to abnormal kidney mobility. The most frequent site of obstruction is at the ureteropelvic junction. So many cases of calculus, kidney infections, and even renal growths present this mobility with a tendency to ureteral kinking that I feel that occlusion from this cause is very important in predisposing to such lesions, the factors involved being urinary stasis and kidney congestion.

The writer has recently removed two pelvic tuberculous kidneys. Undoubtedly the poor drainage in the displaced organs predisposed to the infection.

The following condition has been observed in several cases Although the kidney does not alter its position the ureters present numerous kinks due to ureteral elongation and dilatation, the result of inflammation. This was clearly demonstrated in several of my cases. A sharp angulation of the upper ureter may occur with slight motion of the kidney, if the ureter be fixed by adhesions or suspended over an aberrant vessel, as in two cases observed. In many cases of abnormal mobility the renal displacement is part of a general visceroptosis, and I would not infer that this condition is often an entity. However, many of these patients have experienced decided relief of symptoms; kidney infections have been checked and the recurrence of calculi prevented by proper support of the kidneys.

Undoubtedly there is additional pressure

Fig. 3. Two sharp ureteral kinks—pyelonephritis.

upon the ureter during pregnancy, in many cases accentuating an occlusion present before conception. The rapidity with which cases of pyelonephritis of pregnancy improve after establishing renal drainage with ureteral catheters again shows how important a rôle occlusion plays in renal infection.

In congenital anomalies of the kidney and ureter renal lesions are common, not only because of the poor blood supply and pressure upon the malplaced organs, but because of the disturbed drainage in these cases. A kidney once enlarged, by its own increasing weight as well as by pressing upon the ureter as it enlarges, increases the ureteral occlusion, and this hastens renal change.

Calculi in the upper ureter are found much less frequently than in the lower portion. They are often of good size and usually require open operation. One calculus, impacted at the ureteropelvic junction, was dislodged after manipulation which was carried out for diagnostic purposes. The operation was postponed, and on two other occasions when the patient presented himself for operation there was a repetition of the colic with further descent of the calculus, until with the last attack he passed the stone, one of large size. While pressure upon the upper ureter, strictures (congenital and acquired), displacement of the kidney by tumors of other abdominal viscera, traumatic injury and plugging occur, still such causes of occlusion are less common here than in the lower ureter.

Fig. 4. Kink at ureteropelvic junction. Pyelonephritis.

In reality, the pelvis and calyces of the kidney should be considered as forming a dilated upper extremity of the ureter, their fibrous, muscular, and mucous coats being continuous. There is the same relationship between the pelvis and ureter that exists between the bladder and urethra. We are well aware of the fact that whether an obstruction to the outflow of urine from the bladder be at the vesical neck or in the urethra certain changes ensue. The bladder at first increases its effort, and this leads temporarily to greater muscular strength, also to congestion, particularly at the point of obstruction. Later, as the obstruction is maintained, the bladder function becomes weaker and urine collects in increasing quantity behind the point of occlusion. So long as the urine remains free of infection and the obstruction increases slowly, this process may continue for an almost indefinite period. Sooner or later, however, the usual course is for an infection to take place from the urinary stream or from instrumentation, the latter usually accompanied by traumatism; and while the continued back pressure has led to a certain degree of permanent change to

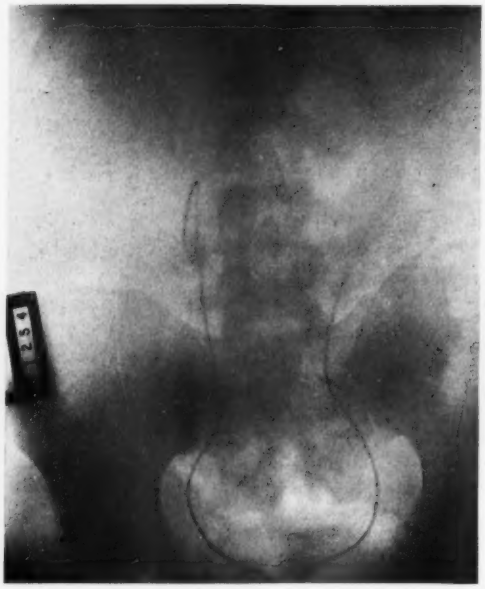

Fig. 5. Prolapsed kidney. Renal calculus.

the bladder wall, the advent of infection rapidly increases the changes.

Pelvic changes are just as inevitable when there is an occlusion of the ureter as are bladder changes in urethral obstruction, rather more so, for the renal pelvis has not anatomically or physiologically the same power of compensation in meeting emergencies as has the bladder. Experimental and clinical investigations show that sudden complete occlusion of the ureter may cause immediate cessation of function in a kidney, or a hydronephrosis may result from a continuation of renal function without exit for its secretion. Partial, incomplete, or recurring ureteral obstruction causes slow dilatation of the ureter above the point of occlusion, dilatation of the renal pelvis and calyces, back pressure upon the urinary tubules, congestion of the kidney parenchyma, with varying degrees of inhibition of function; and invariably, unless relieved, leads to infection from the bacteria constantly supplied to it, the last step being actual kidney destruction.

These observations lead me to suggest what might be termed the stage of preparation in

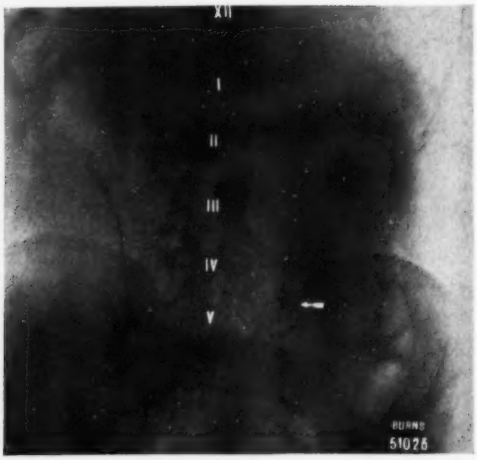

Fig. 6. Prolapsed kidney. Renal calculus.

all kidney operations. Much has been written regarding the preparation of the patient for prostatectomy, and the importance of this preparation, as well as operation in two stages, is well recognized. Oftentimes this preparation is more important in prostatectomy, for both kidneys are actually impaired, yet the more carefully we study our kidney lesions the more often we find the supposedly sound kidney suffering not only from the double work thrown upon it, but to more than double work due to absorption from the diseased organ.

In continually reviewing the histories of urological cases, in cystoscopic studies, in glancing over roentgenograms and operations, I am more and more impressed with the rôle of kidney drainage in the causation of renal pathology. I am also quite as impressed with the remarkable reparative power in the kidney, i.e., the rapidity and completeness with which the kidney regains its function when drainage is re-established, particularly when (in addition as should always be the case) the amount of work thrown upon the kidney is reduced.

These points are well illustrated by the following typical case:

A woman, 34 years of age, was seen in 1915. She gave a history of obstinate constipation. Four years previously, during pregnancy, she had ex-

perienced a sharp renal colic. Three months before I saw her, a calculus 1 centimeter by 1.5 centimeters had been removed from the right ureter and a urinary fistula had persisted. By intra-ureteral manipulation I dislodged a calculus in the ureter below the fistulous opening. Kidney drainage with a ureteral catheter resulted in a closure of the fistula. At this time, both kidneys presented a colon bacillus infection, the function of both was diminished; the right being one-third that of the left. The right kidney was large and prolapsed. Further manipulation in the ureter and renal lavage, with periods of continuous kidney drainage with ureteral catheter, resulted in the passage of twelve calculi (in all), the last being 3.5 centimeters by 1.5 centimeters in size. The rapid improvement of the general and local urinary condition, both during and after this period of treatment, until the passage of the last calculus in 1917, a period of a little over 2 years, was most gratifying; and today with abdominal support and moderate attention to diet and bowels she has two kidneys free of infection, with only a slightly diminished functional activity of the right kidney.

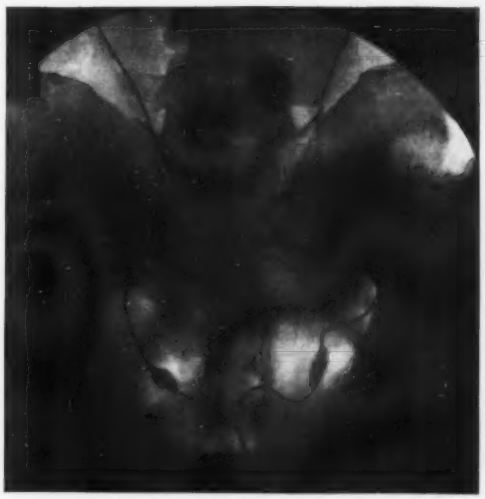

Fig. 7. Bilateral ureteral calculi. Calculus in left ureter passed following intra-ureteral manipulation.

From the foregoing it will be seen that the ureters, the normal conduits of the kidneys, are small tubes which from their anatomical position and conformation are particularly liable to occlusion. Such occlusion may be due to many causes, and its occurrence is an important factor in the promoting of renal lesions.

The diagnosis of ureteral occlusion should be made early and steps taken for its relief that the symptoms may be eliminated and kidney destruction prevented.

The relief of ureteral occlusion requires a most careful study of the patient as well as of the urinary organs. It may be termed the first step in kidney operations.

With the patency of the ureter re-established, free drainage of the kidney restored (possibly with the aid of indwelling ureteral catheters), and lavage of the renal pelvis; and with a lightening of the load thrown upon the kidneys; the regeneration of kidney function is often remarkable; a kidney operation may be averted, or a conservative operation supplant a nephrectomy in establishing a cure in a much improved patient.

CONGENITAL DEPRESSIONS, SINUSES, AND CYSTS OCCURRING IN THE SACROCOCCYGEAL REGION[1]

By R. W. McNEALY, M.D., Chicago

I PURPOSE in this brief paper to discuss those depressions, sinuses, and cysts which are of congenital origin and are found in the median line of the back over the coccyx or the lower portion of the sacrum. I shall confine my discussion of the cysts to those of simple epithelial lining (simple dermoids).

Wette classifies these conditions according to the degree of the anomaly into: (1) fovea sacrococcygea, (2) fistula sacrococcygea, (3) epidermoid sacrococcygeal cysts. He holds that they are all only varying degrees of the same type of anomaly.

Dèsprès and Lannelongue state that these anomalies are to be found, in some degree, in one-third of all newborn infants, but that by adult life they are found in only 3 per cent of people examined. Since my attention has been called to these conditions I have been impressed by their frequent occurrence, without their ever having been noticed by the patient.

The large majority of cases are found in males. In discussing postanal dimples, Lynch states that all of his 51 cases were males. Griffon and Archibald had only 2 females in their 31 reported cases. I have had only one female in my operative cases, although I have found the condition present in many females in the course of examination.

Most of these cases escape notice until adult life when due either to infection or rapid increase in size, they become troublesome.

The fovea coccygea or simple depression, as a rule, gives rise to very little trouble.

The sacrococcygeal fistulæ may be single or multiple. They may be simple epithelium-lined canals extending from the skin surface to a variable depth in the loose tissue over the sacrum or coccyx. Where infection is present, or has been present, the epithelial lining is replaced by granulations and connective tissue. It is not uncommon to find these fistulæ filled with loose hairs which Hodges maintains are rubbed off of the body and crowded into these fistulous openings. Some of these fistulæ have dilated cysts at their depths which contain loose hair, cholesterin crystals, and the products of skin glands. The presence of hair in these fistulæ and cysts has always attracted considerable attention as well as speculation as to the origin of the hair. These hair-filled fistulæ and cysts are termed pilonidal sinuses and pilonidal cysts respectively.

It is apparent that the fistulæ may be primary or secondary. The secondary fistulæ follow suppuration and discharge of the contents of a cyst. The discharge may find its way through a preformed epithelial tract or it may burrow for some distance through the soft parts before coming to the surface. I had one case in which there were three widely separated fistulous openings. One opening occurred in the mid-line about 1 centimeter from the anus; the other two were about 2 inches above the first and about 1 inch on either side of the median line. The three fistulæ originated from an infected cyst near the tip of the coccyx. The two upper fistulæ were the result of the pus burrowing in the soft tissues; while the lower fistula followed in the tract of a congenital epidermal invagination.

The dermoid cysts of the sacrococcygeal region vary in size and are generally situated immediately beneath the skin, but they are sometimes found deeper near the tip of the coccyx. Wette reports one case where the cyst was found in the spinal canal. As a rule the cysts are adherent to the skin, or connected to it by the apex of an invagination of epidermis. In dissecting out these cysts it is customary to find them connected to the spinal column by fibrous bands. The walls of the cyst vary in thickness, depending upon the amount of connective tissue present. Some of the cysts are lined by stratified squamous epithelium and show hair follicles and rudiments of sweat and sebaceous glands.

[1]Read before the Chicago Surgical Society, November 15, 1918.

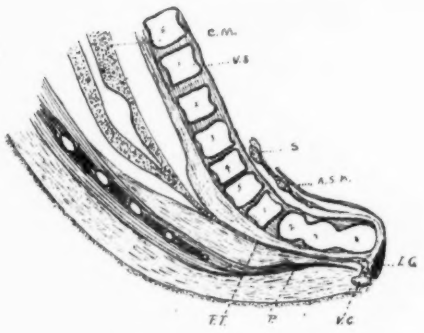

Fig. 1. *C. M.*, Conus medullaris; *V. S.*, vertebra sacralis; *S.*, sympatheticus; *A. S. M.*, arteria sacralis media; *L. C.*, ligamentum caudale; *V. C.*, vestiges coccygiens; *P.*, periosteum; *F. T.*, filum terminale. (After Unger and Burgsch.)

Czyewicz describes a case in a man 23 years of age in which the cyst contained a bunch of hair but there were no hair follicles in the remaining epithelium lining the cyst. In the cases operated upon by me, I have never been able to demonstrate hair follicles in the epithelial linings of the cysts, although several showed bunches of hair.

Many theories have been advanced to explain these fistulæ and cysts.

Mason Warren thinks they arise from the hair growing in an abnormal direction from the follicles, the irritation caused by the hair causing inflammation which results in fistulæ or cysts.

Lawson Tait attributes them to rudimentary tail formation in man.

Kuhn believes they are the remains of a hydrorrachis beginning during intra-uterine life.

Lannelongue believes them to be due to a persistence of a fœtal connection which exists between the external skin and the lining of the medullary canal. The persistence of this connection causes the fistulæ, and when the fistulæ are later constricted, cysts arise. He explains the characteristic localization of the lesions by the fact that the mesodermal masses which produce the separation between the medullary canal and the external skin are less well developed in the coccygeal region than elsewhere. In this way they have less force to loosen this connection during the developmental period. This theory is accepted by Peyramaure-Duverdier and Couroud. Wendelstadt and Wette have a similar theory except they think the site of the fistulæ and cysts is due not to insufficient development of the mesodermal masses but to delayed closing of the medullary canal.

Masse assumes that they owe their origin to the persistence of the medullary tube.

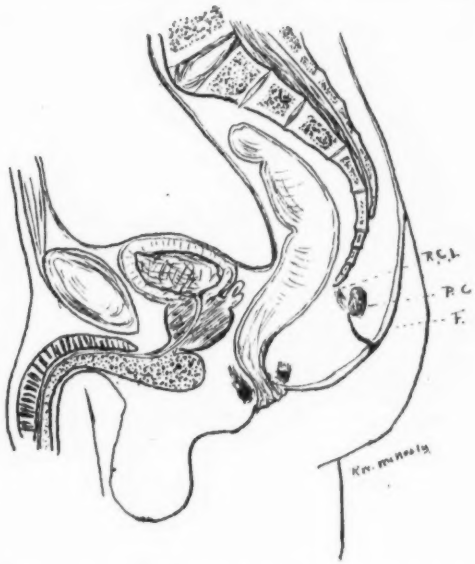

Fig. 2. *F.*, Fistulous tract; *P. C.*, pilonidal cyst; *R. L. C.*, remnant of caudal ligament.

Madelung believes them to result from an abnormal development of the ligamentum caudale.

Mallory made microtome sections through the sacrum and coccyx of various aged embryos. He concluded from his findings that these fistulæ and cysts are due to an incomplete obliteration of a fœtal canal and reasoned that since they all extend upward and posteriorly to the coccyx, the medullary canal seemed the most likely origin.

The theory which is usually accepted at present is the one formulated by Tourneux and Herrmann based upon their interesting work in embryology. The development of the central nervous system by infolding of the primary ectoderm needs no explanation, except to explain certain departures from the uniform development which are peculiar to the caudal end of the spinal cord. The description of these changes I have taken from Keibel and Mall's book on human embryology.

If one examines a sagittal series through an embryo 11 centimeters long (as shown in Figure 1) it can be seen that the extreme tip of the cord lying in the tail anlage has been closed off to form a simple epithelial sac. The lumen of the cord above this point becomes obliterated and there results a slender solid strand of nervous tissue which we know as the

filum terminale. The epithelial sac becomes the vestige medullaire coccygien of Tourneux and Herrmann, the development of which is described by Tourneux[1] as follows: At the beginning of the third month the neural tube still extends to the extreme end of the vertebral column into the tail bud and its slightly enlarged tip is closely united to the deep layers of the skin. Toward the end of the third month the spinal column, developing faster than the soft parts, draws along the part of the neural tube that is adherent to it and whose extreme tip remains attached to the skin. As a result of this unequal growth the terminal or coccygeal portion of the neural tube becomes bent in the form of a loop, the more deeply situated limb of which is attached to the posterior surface of the coccyx (segment coccygien direct), and the other more superficial limb extends obliquely from a caudal and ventral position to one more dorsal and cranial (segment coccygien réfléchi). During the course of the fourth month the more deeply situated limb, the segment coccygien direct, atrophies and disappears, while the more superficial one, the segment réfléchi, continues to develop into the fifth month and gives origin to cell cords or cell masses which contain cavities lined either with prismatic or pavement epithelium; these are the vestiges medullaires coccygiens or paracoccygiens. These structures from the sixth month on suffer a progressive atrophy, but it is possible to recognize traces of them up to the time of birth.

The simple depressions and the fistulæ are explained by the more rapid growth of the soft parts causing traction of the ligamentum caudale upon the vestiges coccygiens which is intimately attached to the deep layers of the skin.

There are two types of cysts. Cysts of the first type are due to dilatation of the epithelial sacs which constitute the vestiges medullaires coccygiens. Cysts of the second type may occur as a result of dilatation of the deep part of a fistula, or to occlusion of a fistulous tract near its outlet. It is possible that they may be formed by the skin anlage being entirely constricted off from the surface and existing in the soft tissue. This difference in origin of the two types of cysts may explain the variations which are to be found in the microscopical examination of the cyst walls. In cysts of the first type nerve cells are sometimes found in the cyst walls. Various mixed tumors are said also to originate from these vestiges coccygiens, but I have purposely omitted any discussion of these or the dermoids supposed to originate from the hindgut or neurenteric canal.

[1] Précis d'embryologie humaine, 2d. ed., 1909, pp. 348, 349.

The treatment of these cases herein described follows the routine technique for similar conditions elsewhere.

The simple depressions, as a rule, give no indications for intervention.

The fistulæ are carefully dissected out and immediate closure made if one is reasonably assured that all the fistulous tract has been removed and no infection is present. If infection is present, it is best to allow tracts to granulate after dissection. I do this in nearly all cases. I have found it advantageous to make a circular incision around the mouth of the fistula and suture it to prevent escape of contents during dissection. Where multiple fistulæ exist, the various ramifications may be shown by injecting Beck's paste and taking a roentgenogram. Lynch recommends the use of methylene blue in peroxide for tracing anal fistulæ and I have employed his method very successfully in these fistulæ. I have also injected iodine into the fistulæ before dissection but do not recommend it.

Some of the cysts are the seat of acute inflammatory changes and must be opened and drained, later following with complete dissection. I had one case come into clinic which had been operated upon four times. Two fistulæ were present at the time of examination. Under general anæsthesia a careful dissection revealed a small cyst containing a ball of hair. The cyst wall was closely attached to the coccyx.

Many of these occluded fistulæ and cysts are diagnosed as furuncles and incised and drained, leaving a chronic discharging sinus. Care must be exercised in not confusing these fistulæ with those of anal, tuberculous, or syphilitic origin. Lynch reports a case in which a degenerating syphilitic focus discharged through a sacrococcygeal fistula and was operated upon several times before its nature was discovered.

In view of the fact that nearly all of my cases had been previously operated upon, I strongly recommend a thorough examination of all fistulæ and cysts occurring in this region. If any trace of epithelial tract is left in these cases a cure cannot be expected.

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DEPARTMENT OF TECHNIQUE

SECONDARY WOUND CLOSURE

Report of 961 Cases

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DURING my service as Chief Surgeon, Base Hospital No. 6, A. E. F., France, March 16, 1918, to January 16, 1919, beginning April 8, 1918, and ending December 11, 1918, 961 secondary wound closures were done, most of them by surgeons who were associated on this service.

The majority of these closures were made on the fourth to sixth day, after the reception of the wound and the primary excision, and before the twelfth day, that is before the thin, bluish, attenuated epithelial edge had formed and the skin had become fixed in its retraction.

The terms, "primary wound closure," "delayed primary wound closure" and "secondary wound closure" are familiar to all. These terms have been employed, however, arbitrarily, it seems to me, to indicate a period of time between the reception of the wound by the patient and the time of closure. Even on this basis, it is well understood that a wound which is excised and sutured not longer than 8 hours after receipt, may heal *per primam*, under surgically aseptic conditions, and thus be regarded as a "primary wound closure." If the wound is left open for 2, 3 or 4 days, whether or not it is treated with Dakin's solution, it may remain surgically sterile, which is determined by quantitative or qualitative bacteriological examinations, and then, be closed and remain closed. This is known as "delayed primary closure." The decision as to whether these wounds be closed or not, is based entirely, in the first instance, on the thoroughness of the excision and chance and, in the second instance, on the thoroughness of the excision, plus or minus the use of Dakin's solution, with a bacteriological check.

Secondary wound closure, on the other hand, is preferably done when, after primary excision, there has developed from the surface of the wound inward, a layer of loose granulation tissue, and underlying stratum of connective tissue, and a cellular barrier of leucocytes; in other words, when the wound has developed not only new tissue formation, but also considerable local resistance, coupled, likely, with a certain amount of general immunity against the bacteria invading the wound, especially the staphylococci. This condition of local resistance, at least, is well known to surgeons, who have operated on abdomens, which have been repeatedly soiled at previous operations, especially for closure of intestinal fistulæ.

With this idea in mind, we, at first, closed a few wounds without bacteriological control and without the removal of the more loosely textured surface granulation tissue with Dakin's solution. This we did, simply by painting the surrounding skin and granulation tissue with iodine, dissecting the granulation tissue and thin layer of connective tissue from the underlying structures *en masse* and closing the wound. Most of our wounds healed even in this way, but a few of them became quite red and swollen, the patient became toxic, and the wound broke down. In these wounds we almost invariably found the streptococcus. We then disregarded entirely the quantitative bacteriological examination of wounds as prescribed by Alexis Carrel, and depended on qualitative cultures to eliminate the streptococcus, in particular, the gas bacillus, and the tetanus bacillus. All wounds not showing streptococcus and the gas bacillus and which had within 10 days sufficient antitetanic serum were closed immediately by our technique of secondary wound closure. This technique was designed to remove mechanically the bulk of all bacteria. When the streptococcus was found present the wound was treated with Dakin's solution by the Carrel method, until the streptococcus appeared no longer in culture. When the gas bacillus was found, the wound was similarly treated and Bull and Prichett's gas bacillus antitoxin was given. The wound when

very moist and covered with necrotic tissue was chemically scoured with Dakin's solution.

Smears were made on small sterile cotton swabs, placed in a culture tube and sent to the laboratory. These swabs were shaken in serum broth, incubated for 24 hours, smeared on a slide and stained by Gram. The streptococcus and gas bacillus were detected microscopically by the fact that they retained Gram stain, by their manner of growth and their morphology. The laboratory reported on as many as 168 such cultures in 48 hours.

Our technique of secondary wound closure was carried out as follows: The surrounding skin was cleaned with ether and painted with iodine and the whole granulating surface was covered with gauze, soaked with iodine. A clear cut incision was made, just outside the epithelial edge, through the skin, and the skin undermined. The granulating area was then undermined and dissected away *en masse*, thus removing mechanically the bulk of all bacteria. The granulation tissue was not scraped off, but was dissected off with a layer of the new-formed connective tissue down to the fresh, bleeding, underlying structures. The raw area was again painted with iodine and all bleeding carefully stopped. Fascial planes were closed, all necessary repair to tendons, nerves and vessels was done, including curettement of bone, and the skin edges were closed without tension.

In this way we closed, in a period of 8 months, 961 wounds, with but one death and that from tetanus, in a case having received three injections of antitetanic serum, the last less then 10 days before the wound closure.

Our functional results were as follows:

	Number	Per Cent
Successful closures	894	93
Partial successful closures	38	4
Failures	29	3
Closures over fractures	23	
Successful closures over fractures	18	79
Failures over fractures	5	21
Cases returned to duty	625	65
Deaths	1	—

The distribution of the wounds over the body was as follows:

Scalp	8
Face	11
Neck	13
Trunk—chest, abdomen, back, flanks	102
Arm—shoulder, arm, forearm	181
Hand	25
Leg—buttocks, thigh	566
Foot	31
Amputation stumps	24
	961

Our method of secondary wound closure enabled us to close a large number of wounds at the most opportune time, between the eighth and twelfth days and immediately after the receipt of the wounded.

The majority of the wounded thus operated upon moved back to duty within 6 weeks, with good functional results. A larger number than that reported would likely have reached duty had they not been transferred to other centers and had we had the opportunity of developing them in our convalescent companies or on our training farms. Those not returning to duty were prevented more by severe injuries to deep structures than by extensive scarring, even in tremendous wounds. The time chosen for closure and our technique of closure favored a supple wound.

Those cases of open wounds with fracture were selected cases, cases showing little or no comminution and no small fragments. Our success with these cases, however, hardly justified a continuance.

The secondary closures of amputation stumps were successful, save for an additional sacrifice of bone. Secondary suture was abandoned for traction and spontaneous closure in most cases.

The loss of life or limb was negligible in our series.

The distribution of wounds closed, their size, contour, depth, etc., will suggest, as was actually the case, the possibility of multiple and varied skin plastics to cover the raw surface.

A great many wounds of the scalp were small gutter wounds and were left to heal by granulation.

The most difficult wounds to close were those of the foot, the hand, and the wounds everywhere over the body, where a circular area of skin had been cut away at the time of the primary excision.

Eliminating the streptococcus, gas bacillus, and tetanus bacillus, wounds of the soft parts may be closed by ordinary surgical technique, with as high a percentage of healing *per primam* as by other methods.

A small dosage of staphylococci or attenuated contamination of the wound by the staphylococci, after secondary excision and secondary closure, does not interfere appreciably with the healing of the wound.

AMBULATORY BRACES IN THE TREATMENT OF FRACTURES AND INJURIES OF THE LOWER EXTREMITIES

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PREVIOUS to the influence exerted by military surgery, it may be said that the use of orthopedic braces following injuries and fractures of the lower limb was limited in America almost entirely to a small group of specialists, chiefly those members of the profession familiar with orthopedic surgery in its most narrow scope. Following the experiences of the war, many general surgeons and practitioners are taking back to civilian life varying ideas as to the usefulness and value of ambulatory apparatus in the late treatment of these lower extremity conditions.

It is not the purpose of the writer to argue the advisability or the advantageous benefits which may accrue from such appliances, rather it is the desire to state briefly their scope of usefulness and discuss, among the maze of models, a few of the most serviceable examples from the point of individual application to various injuries.

Proper ambulatory apparatus may be of benefit in that it permits an otherwise bedridden patient to be up and about, at the same time improving frequently his general as well as his local nutrition. Bone repair is hastened and regeneration stimulated through functional activity in accordance with Wolff's law. Further, crutches may be abandoned with a resulting improvement in the patient's psychology. Over and above these considerations, however, remains the great outstanding fact that the incidence of deformity is materially lessened.

The contra-indications are largely a matter of good surgical and mechanical judgment, manifestly weight-bearing and mobility in the presence of active infection or active infection only recently quiescent, are therapeutic aids of doubtful value. More important is the fallacy of ambulatory apparatus in cases of complete non-union particularly those fractures accompanied by bone loss with the extremities not approximated.

Catalogues of private "appliance makers," contain frequently astounding examples of mechanical ingenuity and architecture, but their intended usefulness is as doubtful and confusing to the medical mind as their accompanying specifications and directions. For the most part these appliances seem to be intended as agents for the correction of mal-union and gross deformities. More often than not, such devices are not only orthopedically wrong, but surgically unsafe. The dangers of extreme pressure exerted on a limb frequently devitalized, need not be emphasized. Almost as a rule it may be stated that the therapeutic usefulness of any appliance is in inverse ratio to its weight and intricacy. The purpose of the following suggestions is to show that with a few mechanical principles borne in mind, and a definite idea as to the therapeutic limitations (*vide infra*), mechanically perfect appliances may be ordered by the surgeon and constructed by any local mechanic. Regular appliance "makers" are better fitted no doubt to manufacture braces for permanent wear, with such refinements as nickel plating, box joints, and carefully finished leather work, but braces made locally under the eye of the surgeon possess often the advantage of better fit and are less expensive. True, if the surgeon is fortunate enough to have in the vicinity a skilled appliance maker, his services should be utilized, but locality is not a matter of serious concern, as a great share of the army brace work has been done by commercial mechanics, unfamiliar with any sort of appliance work.

Real impetus was first given the use of ambulatory braces in the military service by our British contemporaries. Types of "walking calipers," and "single irons with T straps" were much used by British civilian practitioners, and it was only natural that these braces became items of common use very early in their hospitals. With the American Expeditionary Forces and at home, the ingenuity of American appliance makers, while retaining mechanical principles, was exerted in the direction of more standardization with the result that in the main, the models described below represent selected and approved types of maximum simplicity.

Experience has shown that with the single exception of the round 5/16 Bessemer steel rod used in the distinctly British type of "ankle brace with T strap" (Fig. 1), the side rods of all ambulatory braces should be of commercial band steel 3/16 by ½ inch. This material is of ample rigidity for adult weight bearing and possesses the advantage of being easy to work. More expensive types of steel have the advantage of less weight, but are

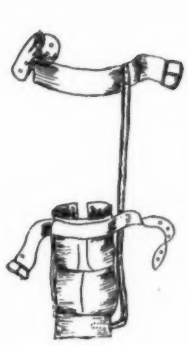

Fig. 1.

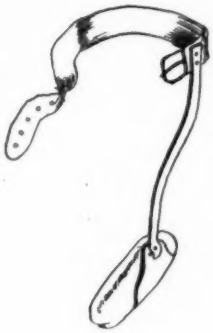

Fig. 2.

Fig. 3.

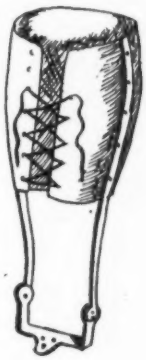

Fig. 4.

Fig. 1. Ankle brace with T strap.
Fig. 2. Ankle brace with modified foot plate.
Fig. 3. Short ankle brace with double uprights.
Fig. 4. Leg brace with laced cuff for weight bearing.

difficult to handle from the mechanic's point of view. Metal calf and thigh bands together with foot plates are cut from commercial sheet steel size 18 to 16 gauge, depending on the weight of the patient and the purpose of the band or plate. Braces, even before assembling, present unusual difficulties in tempering and the method now employed at the Walter Reed General Hospital has proved extremely simple and entirely satisfactory. At the time of completion of the metal work the appliance entire is dropped into linseed oil, the oil is then burned off with a gasoline blow torch and the appliance plunged into cold water. The temper thus obtained is a slight added springiness. The process has the advantage of giving to the metal a dark non-rustable enamel-like coat, the residue of the burned oil. All braces should be made to fit the part as snugly as is consistent with the mechanics; however, as a rule, uprights should not touch the leg and need not be padded. In the majority of instances, webbing straps and covering serve as well or better than leather and are less expensive. Joints need not be forged and machined, for experience has shown that ¼ inch rivets are perfectly serviceable.

Ambulatory apparatus is indicated to *relieve weight bearing, correct deformity, prevent deformity, limit normal ranges of motion, and restrict abnormal ranges of motion.* When ordering apparatus these five limitations must be borne in mind, and a decision made as to exactly which among them apply to the individual case. No one appliance perhaps performs all of these functions nor is it necessary that it should. Certain of them are indicated, the others may be disregarded, but over this principle surgeons stumble more frequently than upon any other consideration relative to the prescribing of braces.

Figures 1 and 2 show two types of ankle braces. Neither model is suitable for weight-bearing and should never be prescribed with that intention. As an example the use of either to prevent or limit angulation so common in the ununited fractures of both bones in the lower third of the leg would be to disregard the principles for which a brace is here indicated. The essential indication in this case would be relief of weight bearing. Both of these braces are of the single upright type and single uprights have the fault of rotating on the calf when the normal weight-bearing column is broken, i. e., the femur and tibia are fractured. The weight then falls somewhat laterally on the single bar with a resultant twisting of the appliance on the limb, leading to a dismal mechanical and orthopedic failure. There follows the axiom that *any weight-bearing appliance must be of the double upright type.*

The apparatus shown in Figure 1 has the advantage of being light, mechanically simple, and particularly suited to the purpose of supination of the foot. It is not a popular model for it has several disadvantages: The T strap is apt to press over the malleolus. The heel and sole must always be raised on the inside. The upright is on the outside. It is further impossible to control flexion and extension of the ankle. And, lastly, the joint situated as it is in a plane 2 inches lower than the normal joint renders normal ankle motion impossible.

Figure 2 combines a modified Whitman foot

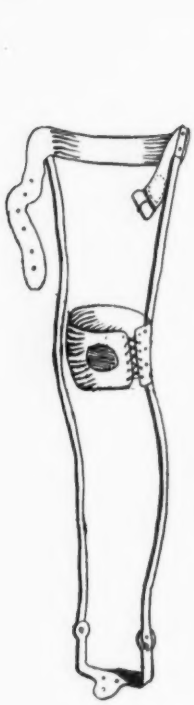

Fig. 5.

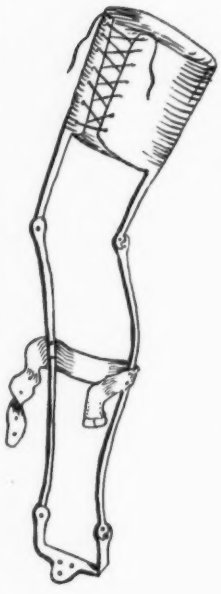

Fig. 6.

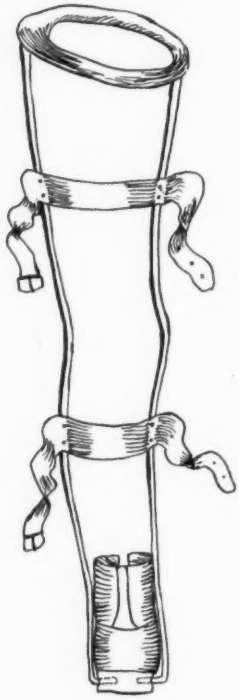

Fig. 7.

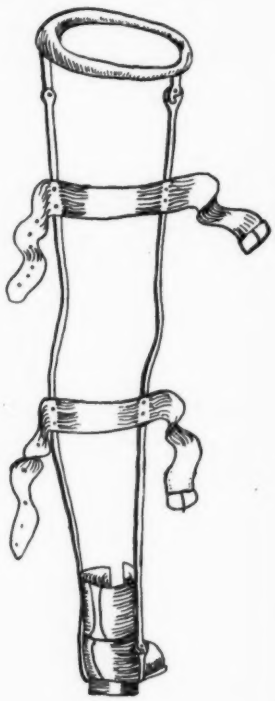

Fig. 8.

Fig. 5. Thigh brace (non-weight bearing), knee cuff.
Fig. 6. Weight bearing thigh brace showing laced thigh corset and stops.

Fig. 7. Caliper with cannon in heel.
Fig. 8. Caliper with stirrup and stops.

plate with a single upright and possesses several commendable features. It may here be stated that other things being equal, a single upright should always be placed on the inside. This situation gives greater comfort, is a cosmetic improvement and is easier to adjust from the point of the brace maker. The foot plate is of distinct benefit in those patients in whom long disuse has so weakened the foot that flat foot is a complication to be feared and in cases of crushing or destructive injuries to the tarsals and metatarsals. The plate together with weight bearing helps to restore the normal foot contour even in cases where ankylosis is the best anticipated result. Further pronation and supination together with flexion and extension may be controlled, this latter by the use of the stop. The stop may be so arranged as to prevent plantar flexion beyond a right angle (Fig. 9, *right angle stop*), or to prevent extension above a right angle (Fig. 9, *reverse right angle stop*). This brace is most frequently prescribed in injuries near the ankle-joint where limitation of motion is the chief consideration and weight bearing may be borne by the foot if the weight is properly directed and the arch protected. The technique for making plaster impressions of the foot preparatory to molding plates may be found in almost any textbook of orthopedic surgery and is extremely simple. These plates may be ordered from any reliable maker and the uprights added locally. There are certain cases where it would seem wise to limit weight bearing and still retain the foot plate. This may be accomplished by ordering the plates with both an internal and an external flange instead of just the single flange for attachment of the upright as shown in the illustration of the brace (Fig. 2). This double upright type for weight bearing should conform in regard to uprights and cuffs to the design and construction detailed as applying to Figure 4.

Figure 3 illustrates the very common double

upright with stirrup brace for lower third leg and ankle injuries. This brace is one of the most useful and easily constructed of the many models. It is of particular value in the familiar inversion and eversion (Pott's) fractures of the ankle. The uprights it will be noticed are short, extending only to the bulge of the calf. The calf band is a posterior metal half cuff of 16 or 17 gauge by 1¼ inch sheet steel riveted to the extreme upper ends of the uprights. This cuff is completed in front by a leather or webbing strap. A word as to the use of encircling bands. All metal bands should be placed so as to half encircle the leg on the posterior surface, never anteriorly. The band should be completed of padded webbing or leather in front. The extremities of the metal bands should be riveted with two rivets at each end to the uprights to prevent lateral warping of the appliance when under strain (Fig. 9). The so-called ankle braces should never be constructed with two metal bands; should the surgeon feel that a second cuff is necessary about the circumference of the lower tibia, the cuff is fashioned of pliable material only.

It is to be understood that the above model, although of the double upright type, is not intended and is totally unsuited to those cases requiring even partial relief from weight bearing. Figure 4 illustrates the only suitable ankle brace with which weight bearing is diminished or relieved, with the possible exception of the brace previously described, the foot plate with double side irons. It will be noticed that this model has a reverse right angle stop at the ankle, longer uprights, and that the posterior metal half cuff instead of being placed at the bulge of the calf, is placed above that point at the level generally referred to as the garter circumference. Weight bearing is then taken by a firm laced leather cuff from four to six inches in width molded in the form of an inverted cone to fit the leg. This cuff when laced allows the swell of the calf muscles to engage in the cuff, and when adjusted takes the body weight in a manner of an artificial limb, i. e., cone bearing socket. An important point is the adjustment of this laced cuff. The brace should be completed independently, then the cuff, unattached to the brace, is laced snugly to the leg. With the brace held in position, the patient is asked to bear weight slowly, the proper position is then marked, allowance being made for stretching, and the cuff is riveted to the uprights. The absolute necessity of laced cuffs adjusted in the above manner cannot be too strongly emphasized. A point of equal importance and one even more frequently disregarded,

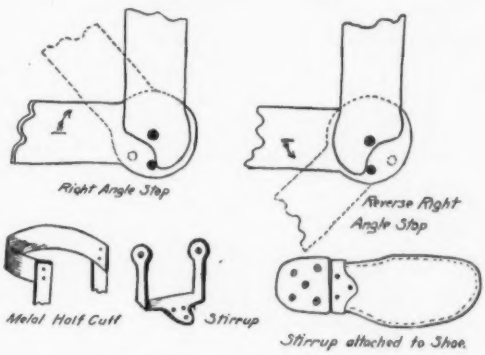

Fig. 9. Details of stirrup and stops.

is the question of joints in these weight-bearing appliances. It should be firmly impressed that a free joint at the ankle or knee materially decreases the effectiveness of the device. As an example, a model to relieve the strain of body weight in a high fracture of both bones of the leg might be made as follows: Double uprights, laced cuff about the thigh, knee-joint with 180° stop, calf band, ankle-joint with reverse right angle stop, attached to shoe by a stirrup, thus we have with the foot at right angles and the knee extended, a rigid iron column; however, as the body is thrown forward, and the knee flexed, some weight must fall in the anteroposterior planes on the leg and thigh, and it is doubtful if even a well-fitting model affords relief from over 60 per cent of the weight. Should the apparatus be constructed with free joints, locking can only take place through muscular exertion and the weight-bearing qualities are infinitesimal.

Figure 6 illustrates the appliance with knee and ankle stop that has just been mentioned as applicable to the relief of weight in high leg injuries.

This appliance with changes in the knee stop suggests itself for a variety of conditions where the region of the knee-joint is to be relieved of weight, and the normal range of motion limited. In constructing thigh cuffs of the laced type as is here used, the same rules apply as for adjustment of the weight-bearing cuff about the calf.

Figure 5 may be considered an extended counterpart of the non-weight-bearing double upright ankle or leg brace as illustrated by Figure 3. This model is limited in use largely to the prevention and correction of lateral deformities about the knee in cases where weight bearing does not enter as a causative factor. Frequently an encircling cuff of pliable material is added about

the knee, a hole cut over the patella to prevent pressure, the knee-joint of the splint made immobile, and the cuff riveted to one side bar only. This, it will be seen when the cuff is tightly laced, exerts a strong lateral leverage either internal or external, depending on the side to which the cuff is attached. For suitable cases, a second cuff may encircle the calf, and be riveted to the opposite side bar for the purpose of greater correction. Caution should be observed in the application of this lateral pressure or strain, for it falls on the ligamentous structures of the knee, and the least troublesome complication will be a stubborn synovitis. The illustration shows the knee cuff in position; however, the appliance is most frequently prescribed without this attachment. The thigh band is a metal half cuff placed posteriorly and completed in front by leather or webbing exactly as described for the calf bands used on the ankle braces.

Consideration of the so-called "walking calipers" for patients recovering from fracture of the femur leads one to be dogmatic, for perhaps more frequently than with any other appliance it is here that surgeons disregard mechanical principles and as a result meet with misfortune. More, it is true that in fractures of the femur, the ambulatory appliance is probably of the greatest value when properly designed. It may be stated that never is a simple non-weight bearing walking brace of value to correct deformity incident to weight bearing where union is not yet firm. Weight bearing being the chief causative agent in the production of the deformity, it follows then that relief of weight bearing is the consideration of maximum importance in choosing the model to be prescribed. Mechanically it is practically impossible and therapeutically it is woefully wrong, to attempt support from the upper fragment of the femur and this fact relieves us of any consideration of encircling thigh bands and cuffs. Weight bearing must be borne above the fractured femur and the logical as well as the point of election is the tuberosity of the ischium. The simplest device to secure ischial bearing is the Thomas ring snugly fitted. The use of an ordinary Thomas splint from which to construct the caliper while mechanically correct, has first the disadvantage of round uprights. Round uprights vibrate under the intermittent impulses of walking, and may produce pain or interference with union. The flat side bars previously described are to be preferred. Second, the cannon in the heel has the disadvantage of forcing an unnatural ankle motion, but this objection is almost nullified by the fact that this model (Fig. 7) has the very great advantage of taking more weight than any other type. Probably its capabilities in this respect when well fitted would exceed 90 per cent of the total weight borne by the normal leg.

Functionally it is unquestionably an improvement to discard the cannon in the heel for a stirrup with a reverse right angle stop and in suitable cases a joint with 180 degree stop may be inserted one inch below the Thomas ring, permitting the ring to tilt when the patient is seated, but locking when weight is transmitted through the ischium to the posterior half of the ring (Fig. 8). A necessary point to be considered is the pitch of the ring; it will be remembered that the external bar of the Thomas splint is longer than the internal, giving to the ring a downward slant from without inward. The angle thus formed is about 55 degrees. The preservation of this angle is essential to the proper mechacnial function of all types of ring calipers.

In conclusion it may be said that each of the types of apparatus above discussed represent fairly standard and approved models, designs particularly applicable to fractures, perhaps, but finding a distinct usefulness in a variety of other conditions that will suggest themselves to the surgeon. In every instance the three factors of cost, simplicity, and a maximum usefulness have been considered; further the military necessity has thoroughly demonstrated the value of the apparatus and has placed the use of ambulatory braces in fractures far beyond the point of experiment.

THE INTERSTITIAL TRANSPLANT OF THE ROUND LIGAMENTS IN THE TREATMENT OF SELECTED CASES OF UTERINE RETROVERSION [1]

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Professor of Clinical Gynecology, Ohio State University; Chief of Staff and Gynecologist, Protestant Hospital

IT is my purpose in this communication to describe treatment of retroversion of the uterus by a surgical method which I have devised and have been employing for the past four or five years in my gynecological clinic in the Medical Department of the Ohio State University, and also in my private work.

In my hands, and in those of several of my assistants, as well as a few of my professional friends who have done me the honor to adopt it as their method of choice in properly selected cases, the procedure has given exceptionally good results.

TECHNIQUE

This technique is made possible by a simple instrument devised by the writer, which he has seen fit to designate by the name "hysterotome." This instrument consists of a blade or needle of curvatures, length, and other dimensions which are best suited to the purpose for which it is intended, namely, to make a passage in certain curved directions through the uterine wall. It is fitted with cutting edges at its point only, while the shaft of the instrument consists of a rounded dilating or non-cutting portion. These blades are made in three sizes, for use in the various classes of cases encountered and are fitted with an interchangeable handle which permits of shifting the direction of the blade, at convenience of the operator, to meet the exigencies which arise during the operation.

The steps of the operation are as follows:

The abdomen having been opened in the median line, the two round ligaments are caught at such a point that they will be on an easy tension when they are approximated directly across the pelvis (Fig. 1). At this point a suture ligature is applied, tied, and left long. This point of approximation is supposed to be the place at which the fundus of the uterus is finally to be suspended when the two ligaments are tied together, as the final step of the operation. The ligaments when stretched across the pelvis should not be tense, but should be adjusted at a degree of easy tension to allow the recognized mobility of the fundus within the normal physiological limits.

The displaced uterus having been raised in the pelvis, the point of the hysterotome is inserted into the tissues as nearly as possible at the point of origin of the round ligament, on the anterior surface of the horn of the uterus. Theoretically, this point of insertion is exactly at the point of emergence of the ligament from the uterine wall, but practically I have found it best to choose a point corresponding to the exact margin of the ligament as it emerges from the uterine horn at its inner and lower aspect. Inserted at this point, the instrument is passed directly backward through the uterine horn, passing under the interstitial portion of the tube. When the instrument has reached a point beyond the tube, its direction is turned downward and inward, traversing the posterior wall of the uterus in a downward and inward direction to a point in the median line and about one inch below the fundus uteri (Fig. 2). Here the instrument is made to emerge on the posterior aspect of the uterus. The eye of the hysterotome is then threaded with a loop of Pagenstecher or silk, which is drawn back through this newly made passage by withdrawal of the instrument. This leaves the newly made passage with the traction loop in place throughout its entirety. This same procedure is then followed out on the other side of the uterus, the point of the hysterotome being made to emerge from the same opening on the posterior surface as it did at the first passage on the opposite side. We are now ready to transplant the ligaments to their new position, and the remainder of the procedure is simple. The ends of the traction ligatures are each drawn through its corresponding passage by means of the loops and in turn each round ligament is drawn into its new position (Fig. 3). As the ligaments are drawn through the uterine walls, the uterus is manually raised into its normal position. Traction is continued until the ligated points of the ligament appear in the puncture opening. The traction ligatures are now tied together, cut short, and the knot allowed to drop back into the uterine wall through the small puncture opening (Fig. 4).

If the hysterotome has been passed with accuracy, and its point made to emerge in each instance through the same opening on the posterior surface of the uterus, no further suturing will

[1] Received for publication July 8, 1919.

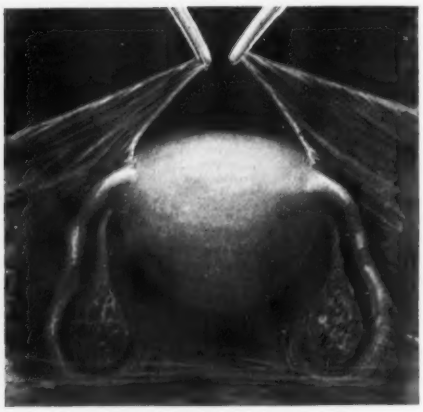

Fig. 1. The two round ligaments are caught at such a point that they will be on easy tension, when approximated directly across the pelvis. Allowance should be made for the normal mobility of the fundus within the normal physiological limits.

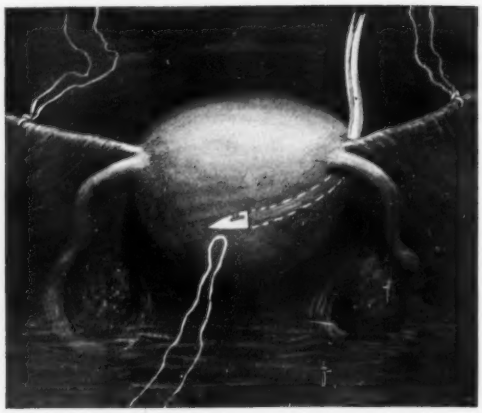

Fig. 2. The point of the hysterotome enters anterior surface of uterus directly at origin of round ligament, is passed under tube, downward and inward through substance of uterine wall, and emerges in median line about 1 inch below fundus; is threaded with loop of silk and withdrawn.

be necessary. In some instances, however, it may be thought best to suture the puncture wound, in which cases a No. 0 plain catgut mattress suture may be used.

In those cases in which one or both tubes have been removed, the same technique may be used. In such a case the ligament is transplanted through the horn of the uterus at the point where the tube has been removed, the advantage being in the absence of stitches with consequently lessened tendency to form adhesions on the posterior surface of the uterus.

The reasons which led to adoption of the technique just described are as follows: During the years from 1899 to 1902 the writer conducted a series of experiments with the object of ascertaining: first, the actual strength of the round ligament as a whole in different individuals; second, the comparative strength of the muscular and tendinous portions of each ligament. These experiments consisted in the subjection of fifteen sets of round ligaments to tensile tests, the experimental material having been obtained from recently deceased subjects, except in one instance, obtained from the living subject. These subjects were, for the most part, coroner's autopsies after accidental death. The autopsies were performed in every instance within 36 hours after decease.

The first part of the inquiry resulted in no data of any value, the different specimens showing such a wide variation in strength as not to be comparable. The result of the second part of the investigation, however, seemed to me of much greater importance. In every instance the ligament stretched, and finally broke, in the muscular, and never in the fibrous, portion.

In the living subject I have repeatedly demonstrated that the tendinous portion of the round ligament is stronger than the muscular portion. During hysterectomy, in those cases in which the round ligaments were not materially affected by disease, the operation was performed in the usual manner with the exception that the upper portion of the broad ligament was left intact and the organ drawn forcibly backward allowing the undivided structures, including the upper part of the broad ligament, as well as the round ligament, to break at any point between its origin and attachment. In more than 30 cases subjected to these tests the round ligaments, with one exception, have broken in the fleshy portion.

Because of these experiments I have always preferred, as the operation of choice, those methods which use the fibrous, and not the muscular portion of the ligament for its sustaining medium.

Further, as my experience in the surgical treatment of retroversion has widened, another essential has seemed to be lacking. A careful review of the entire field of operative procedures for the cure of this condition has failed to reveal any method, with the exception of the old Alexander-Adams operation and one or two of its modifications, which attempts to utilize the sustaining action of the round ligaments strictly in the

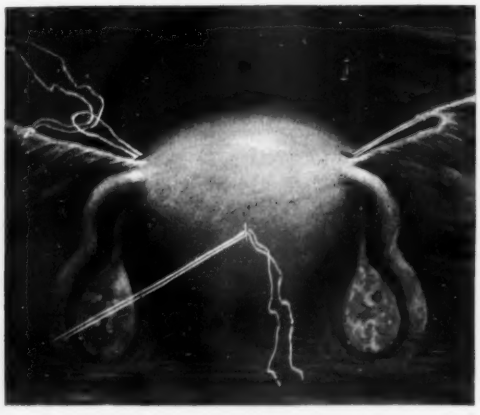

Fig. 3. The ends of the traction ligatures are each drawn through the corresponding passage by means of the loops and in turn each ligament is drawn into its new position.

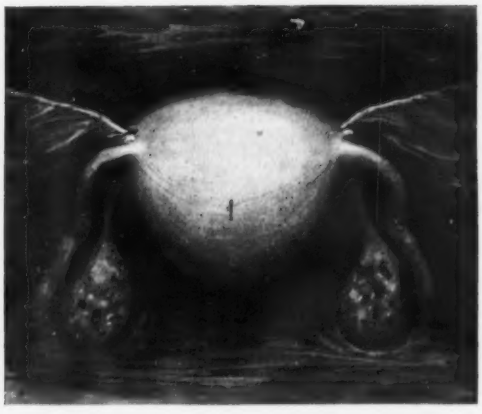

Fig. 4. Traction is continued until the ligated point of the ligaments appears in the puncture opening. The traction ligatures are tied, cut short, and the knot allowed to drop back into the uterine wall through the puncture.

direction of their origin and insertion, without which line of traction it is impossible for these structures to act physiologically. Such abnormal line of traction must result in undue tension which is more or less continuous. No tissue of the body is so constructed as to be able to maintain a condition of continuous tension, and such a state must inevitably result in stretching and atrophy of the overworked ligament, or pain to the patient, or both.

Furthermore, it has seemed desirable to avoid, as much as possible, the use of suturing or other trauma of the peritoneum, in making the new attachments, since the liability of adhesions with the accompanying complications is directly in proportion to the amount of suturing or trauma made necessary by the technique used.

ADVANTAGES

It is upon the foregoing observations that the interstitial transplant of the round ligament has been devised. Thus far this method has shown the following advantages:

1. The round ligaments are utilized to exert traction strictly in their anatomical direction. Thus the operator has imposed upon them no undue strain, which in turn favors a physiological and comparatively painless convalescence.

2. The utilization of the stronger tendinous portion of the round ligament as a supporting structure lessens the danger of recurrence as far as relaxation of the structure is concerned.

3. No encroachment upon, and consequently no strangulation or distortion of, the lymphatic, vascular, or nerve structures lying between the layers of the broad ligaments.

4. No adhesions or artificial bands stretching between the uterus and the abdominal wall in front, with consequently no danger of strangulation of the intestine through the apertures so formed.

5. Minimized trauma. The elimination of suturing on the posterior uterine wall lessens liability to the formation of adhesions, as compared to all other operations in which there is extensive suturing of the round ligaments to the posterior uterine surface.

6. During pregnancy the transplanted portion of the ligament being muscular partakes of the hypertrophy of the uterine wall, and adjusts itself accordingly to this physiological change.

7. The operation is simple and reduces to a minimum the question of the personal equation in different operators. By following literally the various steps of the technique, the operation can be performed by operators of different degrees of skill with equally good results.

I have frequently been urged to publish my technique for suspension of the uterus, but have been unwilling to do so until enough time had elapsed and a sufficient number of cases had been operated upon, to bring out and test the essential points which would demonstrate the value of the procedure. In the meantime I have been content to work out the desired end by demonstrating the method in its various stages of development, in my operative clinic and to my professional friends.

These essential points are: (1) permanence of

anatomical results; (2) restoration of function in the pelvic organs; (3) avoiding the creation of pelvic adhesions.

Approximately four years have elapsed since this method, as now practiced, has been in use.[1] During this period 118 patients have been operated upon, nearly all of whom have been kept under fairly accurate observation. Only such cases are included as have been considered typically suited for the study of the results of the procedure for the purpose for which it was designed; as a remedial measure for retroversion, with restoration and preservation of all of the pelvic functions. In fact, some of these cases have already had opportunity to withstand the trials of pregnancy. No account has been taken, therefore, in many cases in which the method has been used but in which sterility was at the same time produced, owing to the necessity for removal of diseased adnexa. It was not for this class of cases that the method was especially devised, although even here it is believed that it possesses many advantages.

Of the 118 selected cases, 67 were already married at the time of the operation, or have since become so. Among those who are married, 15 pregnancies have occurred. Two of these ended in confessed criminal abortion, three pregnancies have not yet terminated, and ten children have been born at full term. These deliveries have been accomplished without a single complication, either during pregnancy, confinement, or convalescence, and in no instance has there been a relapse to the former displacement.

Owing to the difficulty which naturally occurs as a result of the passing of patients from the operator's observation, no tracing of such a series, with a view to ascertaining the permanency of anatomic results, can be made with absolute accuracy. It is also conceded that sufficient time has not yet elapsed since operation of some of the later cases in the series, to furnish reliable data upon this phase of the subject. Yet the writer has examined, or received reports from reliable men who have examined, all but 5 of the 118 cases. These examinations seem to demonstrate an extremely high degree of anatomic and physiologic restoration.

In the entire series there have been observed but two cases in which the anatomical results are not all that could be desired. These two cases were not true relapses, but should be classed as failures at the time of the operation. They both occurred early in the series, and were due to technique not having yet been perfected.

[1] February 1, 1919.

REMOVAL OF MACHINE-GUN BULLET FROM SACRAL CANAL

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AND
Captain HERBERT M. BERGAMINI, M.C.

IT is the object of this paper to present the operative procedure used in the removal of a machine-gun bullet from the sacral canal of the vertebral column. A brief history of the case will suffice, as the interest lies wholly in the rather novel operative technique employed.

The patient, an infantryman, was admitted unoperated upon to the American Red Cross Military Hospital No. 2, Paris, France, on October 9, 1918, 4 days after being wounded. He had been coughing blood and had been unable to urinate or defæcate since injury. On examination there were 2 wounds. One in the left supra-clavicular region overlay a fractured clavicle. The other was situated in the right loin. The left chest contained fluid. There was a complete sensory and a nearly complete motor paralysis of both legs. By X-ray a machine-gun bullet, point down, lay fairly in the vertebral canal at the level of the second lumbar body. It was undetermined by which wound this missile entered. There was a fracture of the transverse process of the first lumbar vertebra.

Under general anæsthesia a laminectomy of the first four lumbar vertebræ was done and the bullet found as shown by X-ray and as indicated in the Figure at "A". It lay anterior to the cord and outside the dura, which it had slightly lacerated. On rotation of the cord, considerable bloody fluid under pressure was released from within the dura. While holding the bullet between the fingers and reaching for forceps with which to grasp and remove it, the bullet slipped and thereafter could not be found. The patient was immediately taken into the fluoroscopic room where it was discovered that the bullet had dropped to about the middle of the sacral canal.

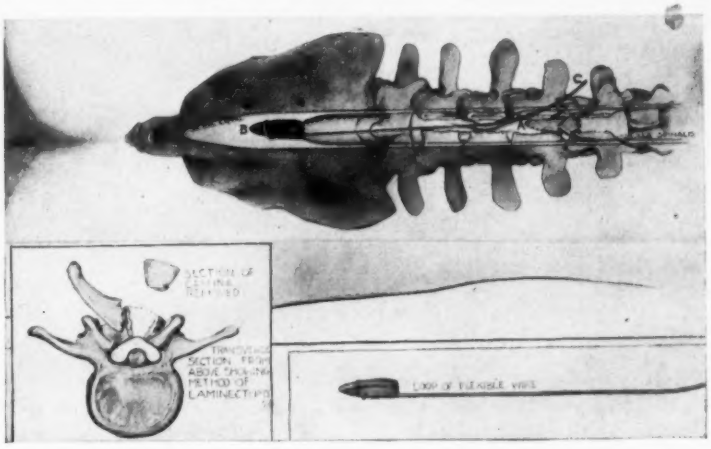

Fig. 1. Showing, *A*, bullet as located by X-ray; *B*, position to which bullet slipped; *C*, the wire.

The problem was how to reach and remove it without partial removal of the sacrum. The following procedure was adopted.

At one end of a piece of flexible bronze wire a loop was made whose diameter was slightly less than the diameter of the body of the bullet. The loop was bent to form slightly more than a right angle with the shaft of the wire. Under fluoroscopic guidance, this loop was passed through the operative wound into the sacral canal and beyond the point of the bullet. By manipulation it was found quite easy to engage the nose of the bullet within the loop and then to withdraw the missile to a point where it could be readily grasped and removed through the operative wound. It was the old principle of the œsophageal "coin-catcher" which when thus applied to the vertebral canal, saved a situation which for the moment promised to be most embarrassing.

The after-history of the case was unfortunate. Bladder control was regained 20 days after operation. There was some improvement in the motor but none in the sensory paralysis. The operative wound healed without difficulty. However, the patient developed a generalized diffuse miliary tuberculosis and died 4 months after operation. The autopsy showing advanced pulmonary lesions.

SOME AIDS IN THE TECHNIQUE OF BLOOD TRANSFUSION BY THE PARAFFIN TUBE METHOD

By THOMAS P. SHUPE, M.D., Cleveland

IN a large number of blood transfusions performed in a British Casualty Clearing Station and in private practice the importance of the following points have emphasized themselves in facilitating the transfusion of blood:

1. A well paraffined tube.
2. Sharp dissecting instruments.
3. Exposure in both the recipient and donor of at least an inch of vein without branches. If branches appear in the exposed portion, they should be tied.
4. A properly applied tourniquet on the donor.

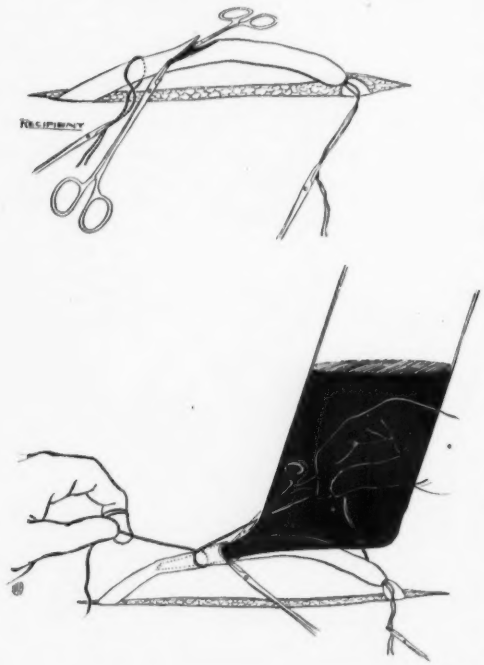

Fig. 1. Schematic drawing showing how suture can be passed around the tube and vein. (From *Some Aids in the Technique of Blood Transfusion by the Paraffin Tube Method. Shupe.*)

5. A few ounces of 5 per cent sodium citrate ready on the table to be used as directed below for the prevention of clots in the tube. The tube should be dipped in the citrate solution before it is inserted in the vein. When the tube is refilled three or four times, a small fragment of clot may remain adherent to the side after it has been emptied. This small clot will form the nucleus of a larger clot, and make the injection of the contents of the refilled tube quite difficult or impossible so that a second tube will be required and from 100 to 200 cubic centimeters of good blood may be lost. This difficulty will be obviated if a few cubic centimeters of the citrate solution are injected into the large opening of the Vincent tube and shaken for a minute, after which the citrate solution is allowed to run out, taking any small particles of residual blood with it.

This simple procedure will also prevent the injection of clots into the vein, with the subsequent danger of thrombosis.

Blood clotting in the vein of the patient with low blood-pressure and the consequent delay of opening a new vein each time a tube is filled, are prevented by laying a gauze sponge saturated with a 5 per cent solution of sodium citrate on the exposed vein of the recipient immediately after the lumen has been opened, and retaining it in place while the tube is being filled from the donor.

By the use of a small amount of citrate in this way, whole blood, and nothing but blood, is given the patient. It is not necessary to mix any citrate or any other substance with the blood to be injected.

6. The accompanying cuts show how a closed connection preventing any regurgitation of the blood between the vein and the tube can be made by crossing a linen suture around the vein and tip of the tube.

In the transfusion of blood more than in any other operation the careful attention to small details assures an easy and successful operation rather than a total or partial failure.

PRE-OPERATIVE AND POSTOPERATIVE TREATMENT TO PREVENT RECURRENCE OF STONE FOLLOWING NEPHROLITHOTOMY

By A. J. CROWELL, M.D., F.A.C.S., and RAYMOND THOMPSON, M.D., Charlotte, North Carolina
Of the Crowell Urological Clinic

IN reviewing the literature of nephrolithotomy, one is struck with two facts: first, the high percentage of recurrences of stone and, second that no one has offered a definite or plausible plan of treatment to prevent their recurrence.

It is generally admitted that infection, trauma, or any condition producing hæmorrhage are predisposing causes to nephrolithiasis. The necrosis accompanying infection, or clot following trauma or hæmorrhage from whatever cause, forms a nucleus upon which the salts of the urine are deposited.

Much has been written on the subject of pyelitis and its treatment by pelvic lavage with the various antiseptic solutions and especially nitrate of silver, but no one seems to have thought of this as a routine preparation for operation and after-treatment as a means of preventing the reformation of kidney stone.

In practically every case of nephrolithiasis calling for operation, we have to deal with kidney infection as well. In such cases the elimination of the infection before operation is very important if we are to obtain the best results possible. This cannot always be done but when it can two things are accomplished: first, union by first intention is made possible; and, second, the recurrence of stone is rendered less probable. This plan of preparation could be efficacious only in cases of infection where the stone is located in the kidney pelvis. Practically all renal calculi, primarily, are located in the kidney pelvis.

This is certainly true with the exception of those cases associated with tuberculosis of the kidney, and those call for nephrectomy.

The statistics given by Cabot and Crabtree cover operations for stone in the kidney and ureter at the Massachusetts General Hospital for 8 years previous to January, 1914. The list includes 155 cases but only 87 of these were carefully examined at the clinic to determine the post-operative results. Of these 87 cases, 66 were operated upon for stone in the kidney, 21 for stone in the ureter. Of the kidney cases, 34, or 51 per cent, were not well, 32, or 49 per cent, were well. Classified according to type of operation, 30 cases of nephrotomy show 13, or 43 per cent, well, and 17, or 56 per cent, not well. In 33 cases of pyelotomy, 16, or 49 per cent, were well and 17, or 51 per cent, were not well. We see from this that the better results were obtained by pyelotomy. This, we believe, is a perfectly natural result since hæmorrhage following nephrotomy is more profuse than following pyelotomy and the probability of clot retention greater. Infection following nephrotomy certainly is more likely to occur.

Their conclusions are that in operations for kidney stone the probability of recurrence is considerable; that it depends somewhat upon an entirely unknown factor,—the liability or ability of that particular kidney to form concretions. These authors state that in their opinion infection is not "a factor of overwhelming importance" in the formation or recurrence of kidney stone. In the last two conclusions, we do not concur but adhere to the theory of infection and hæmorrhage as predisposing causes to stone formation.

Braasch, of the Mayo Clinic, concludes after a study of 88 cases operated upon there that about 10 per cent have recurrences. Frayer, of London, believes that recurrence is so frequent that non-surgical interference is the better policy to pursue unless decided symptoms are present. He believes that recurrence is almost inevitable.

Such divergence of opinion from men of their prominence and clinics of such wide reputation is proof positive that enough work on the subject has not been done to make the present statistics of value as to the frequency of recurrence. Practically nothing has been suggested to prevent their reformation.

The above mentioned plan of treatment occurred to us while working out the following case:

Mrs. S., age 43. Complaint, pain in the back. The family history was negative. The patient had had the ordinary diseases of childhood, with no complications. She was married at the age of 20 and has 3 healthy children. No history of typhoid fever or any illness which would act as a predisposing cause to nephrolithiasis was obtained. The patient began to suffer with severe pain in the back about 8 years ago. These attacks occurred at frequent intervals and were accompanied with pain, chills, loss of appetite, etc. Occasionally hæmaturia was present during an attack. The pain in the back was aggravated by motion. For the past 6 months there has been slight frequency of urination. Two weeks ago the patient had a severe attack of colic, chills and high fever.

Examination. The patient had an anxious expression. She was anæmic, and had no deformities. The eyes,

ears, nose, and throat were negative. The teeth were bad. The heart and lungs were normal; blood pressure—systolic 120; diastolic, 80. Palpation gave negative results. Percussion elicited considerable tenderness over each kidney, more marked on the right side. Urinalysis showed: reaction, acid; specific gravity, 1022; many pus cells, few red blood-corpuscles; albumin, moderate amount; sugar, negative; casts, negative. Leucocyte count, 14,000. The Wassermann reaction was negative. Cystoscopy showed the bladder capacity to be 300 cubic centimeters. There was marked trigonitis with slightly gapping and inflamed ureteral openings. Ureteral catheterization showed considerable infection of both kidneys, but more marked on right side. X-ray examination showed a stone in each kidney. Thorium pictures demonstrated their presence in the kidney pelves. The phthalein output from the right kidney was 18 per cent, from the left 20 per cent, in 15 minutes.

Pre-operative treatment. The patient was prepared for operation by irrigating the kidney pelves with a solution of nitrate of silver twice weekly, beginning with 0.5 of 1 per cent and increasing 0.5 per cent each treatment. After six treatments there was no evidence of infection in the left kidney and very little in the right.

Operation. The patient was placed on the stomach. The regular renal incision was made. A stone was removed from each kidney by pyelotomy. The incisions in the kidney pelves were reinforced with masses of fat. The left incision was closed completely. A small drain was left in the right for 2 days. Both wounds healed by first intention.

Postoperative treatment. We began pelvic lavage with a solution of nitrate of silver two weeks after operation and will continue until there is no evidence of infection of the kidney pelves.

There was practically no pus in the urine obtained from the left kidney at the first catheterization after operation.

SUMMARY

1. Recurrence of kidney stone is very frequent.

2. No one has offered a definite or plausible plan of treatment to prevent their reformation.

3. Pelvic lavage warrants further investigation as a possible method of preventing the recurrence of stone.

CHRONIC ABSCESS OF PROSTATE CURED BY INTRA-URETHRAL PROCEDURES

By PAUL W. ASCHNER, M.D., New York
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THE history of this patient is presented because of the opportunity offered by the circumstances of the case to attain a permanent cure, without resorting to surgical intervention, of a very persistent gonorrhœa complicated by a chronic prostatic abscess.

Mr. E. C. was seen by me July 9, 1916. He contracted gonorrhœa six years ago, since which time he had been constantly under physicians' care. He was never free of discharge for more than a few weeks at a time, the left testis had been swollen at least twenty times, and about two months previously an attack of epididymo-orchitis was accompanied by chills, fever, and swelling and redness of the perineum. This swelling subsided with rest and cold applications, and local treatment had been abandoned. There had been no arthritic symptoms. The patient stated that at one time in the course of his illness he had been treated for premature ejaculations and sexual weakness, and that these symptoms were still present.

Examination showed the following: a thin mucopurulent urethral discharge showing pus and typical gram negative intracellular diplococci; first urine moderately turbid, second urine slightly turbid; right testis normal; left epididymis thickened and nodular especially at lower pole; body of left testis soft, small, and atrophic. Rectal examination: both seminal vesicles palpable, enlarged, irregular in outline, indurated, with strands of dense tissue running upward and outward toward the pelvic walls; left lobe of prostate enlarged to twice normal size, doughy in consistency and yielding on massage yellowish fluid showing pus and gonococci. On the right side was a large, soft, fluctuating swelling, and gentle pressure upon this caused a stream of pus to issue from the urethra, thorough massage yielding two ounces of thick, brownish-yellow pus showing a few gonococci. When emptied the abscess was felt to occupy the lower half of the right prostatic lobe, above which the remaining prostatic tissue presented a dense rigid prominence. The abscess cavity was separated from the rectal lumen by a thin membrane only.

The patient had been told that operation through either the rectum or the perineum would be necessary. There were two contra-indications to surgical intervention: (1) curing the abscess by incision and drainage would not cure the gonorrhœa as the rest of the prostate, the seminal vesicles, and the posterior urethra were infected; (2) it was reasonable to assume, judging from the free flow of pus when the abscess was pressed upon, that the urethral opening of the cavity was of such size that operation might leave the patient with a perineal or urethro-rectal fistula.

The following measures were therefore taken in the hope of curing the gonorrhœa, and causing the abscess to contract in size or granulate sufficiently to obliterate the cavity. The patient was instructed to avoid alcoholic beverages and sexual activities. He was instructed to inject with ½ per cent protargol four times a day. Every day the urethra and bladder were irrigated with the same solution, and the prostate, vesicles, and abscessed area thoroughly massaged, followed by another irrigation. The irrigations were given with a 150 cubic centimeter Janet Frank syringe (no catheter being used).

With this treatment the gonococci disappeared rapidly from the urethral and prostatic pus and in one month the contents of the abscess cavity were reduced to about one dram of thin pus. As the condition then remained about the same for some time, it was decided to examine the posterior urethra to see, if possible, the location of the abscess opening.

September 17, 1916. Cysto-urethroscopy showed normal bladder, trigone and ureteral orifices. The posterior urethra presented moderately enlarged lateral lobes and large patulous prostatic duct openings. The verumontanum was large and congested with a deep utriculus. No pus was seen coming from any duct openings, but slight pressure exerted on the abscessed area through the rectum caused thick pus to well up from the sulcus to the right of the caput, the latter enlarged body apparently overhanging and hiding the actual orifice from view.

September 26, 1916. An ordinary posterior urethroscopic tube was passed in the hope of being able to pass the jaws of a long thin alligator forceps into the opening of the abscess. This was entirely unsuccessful as the caput occupied most of the field and I did not care crudely to plunge through this structure and the wall of the posterior urethra, and perhaps miss my objective.[1]

Soon after this examination (October, 1916) protargol therapy was stopped, but gonococci reappeared and treatment had to be resumed. The pus from the prostatic abscess now showed bacteria other than gonococci (secondary invaders), as did also the mucoid urethral discharge.

On January 30, 1917, about 7 months after beginning treatment, protargol therapy was again stopped. Repeated careful examination of the urethral discharge, shreds, and prostatic secretion revealed no gonococci, although other bacteria (all gram positive) were present. The patient was now instructed to inject three times daily with 1:20,000 corrosive sublimate, and 10 grains of urotropin was prescribed three times a day.

Although the gonorrhœal infection had been overcome, the secondary infection caused a persistence of the prostatic abscess, which yielded about two drams of thin pus on massage. The drainage was apparently insufficient to secure the desired results.

It seemed imperative, therefore, to improve the drainage by enlarging the intra-urethral opening of the abscess, and with this object in view Leo Buerger was consulted. His cysto-urethroscopic examination, February 26, 1917, revealed the same picture which I had found five months before. He suggested and performed, with the rongeur forceps, the removal of that part of the verumontanum overhanging and hiding the abscess opening. This opening we found smaller than anticipated and a week later it was enlarged by means of the scissor forceps through the operating cystoscope.

I then continued along this line of therapy. At intervals of ten days the operating cystoscope was passed, the opening into the abscess was stretched by passing through it dilating olives of increasing size. Following the dilatation a No. 7 ureteral catheter was passed well into the cavity and the latter thoroughly irrigated through the catheter with a 1:4,000 mercuric cyanide solution. After one of these treatments a mild epididymitis occurred in the right testis, which subsided in a week.

It was observed that whereas it was formerly necessary to exert pressure through the rectum in order to demonstrate the pus coming from the abscess cavity, there was now spontaneous drainage through the enlarged urethral opening of the abscess. The urethral discharge diminished markedly and finally ceased. The urine which at first, because of the establishment of spontaneous drainage, became more turbid, became much clearer as the abscess cavity diminished in size.

On May 2, 1917, the following was the status: No urethral discharge; first urine clear with a few shreds, second urine clear; right testis feels normal, left testis atrophic as originally noted. Rectal examination: both vesicles irregular, firm, but small and not distended; left prostatic lobe somewhat enlarged yielding thin watery fluid with a few leucocytes on massage; right prostatic lobe smaller than left and presenting a depression at its lower pole, this representing site of former abscess. Massage of this area yields six or seven drops of thin yellowish-white fluid showing a few pus cells and some gram positive diplostreptococci.

On June 2, 1917, cystoscopic examination showed normal bladder, ureteral orifices and sphincteric region. To right of caput was seen a large opening from which a slightly cloudy fluid drained spontaneously.

On October 1, 1917, examination showed no discharge, urine clear with a few shreds. He felt well and looked well. Massage of the prostate yielded several drops of thin fluid which showed a few pus cells and some bacteria. He had had no treatment for a month and was cured of both his gonorrhœa and his prostatic abscess. I attached no clinical importance to the slight residual prostatitis which was present. His sexual symptoms, however, still persisted.[2]

According to McCarthy the majority of prostatic abscesses begin close to the deep urethra. Of 104 cases, 74 opened spontaneously into the posterior urethra, producing single, multiple or cribriform openings. Of these 74 cases 27 per cent subsequently developed serious complications and the author therefore advocates incision and drainage through an inverted incision in the perineum. I concur heartily with his plea for conservation of the urethra avoiding the operations of Alexander and Proust. Incision through the rectum is, of course, the last possible choice of procedure.

It is in the group of cases which evacuate spontaneously into the urethra and which suffer from continued infection due to insufficient drainage that intra-urethral procedures such as detailed in the case above find their field of usefulness. Massage alone will not effect a cure.

Crockett, in 1917, published a technique for obliteration of persistent prostatic abscess cavities using the ordinary posterior urethro-

[1] A method employing the posterior urethroscope has since been published by Frank S. Crockett, Indianapolis M. J., 1917, xx, 517.

[2] Re-examination, May, 1919, showed the same findings.

scope. The method appears to be exceedingly difficult of application, necessarily inaccurate, and too coarse for safe use in a complicated structure like the posterior urethra. The development of the operating cystoscope and cysto-urethroscope, however, makes the procedures employed in my case exceedingly safe, accurate, and effective. It was surprising how readily the posterior urethra accommodated and tolerated the operating cystoscope, the Albarran deflector, and the various instruments passed through the cystoscope. Even local anæsthesia was unnecessary. Crockett's technique could not have been employed here as my failure in attempting a similar mode of attack proved.

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COCCYGODYNIA

Further Experience with Injections of Alcohol in its Treatment[1]

By FRANK C. YEOMANS, M.D., F.A.C.S., New York

In a communication to this society in 1914, entitled, "Coccygodynia, a New Method of Treatment by Injections of Alcohol," the writer reported seven cases relieved or cured. The leading symptom is pain in the region of the coccyx. At this time it will suffice to recall the theories of causation of this pain:

1. *Neuralgic theory* (Marro, Pozzi and others) that an initial trauma caused violent nerve irritation which persists without any demonstrable anatomical nerve lesion.

2. *Neuritis*, as occurred in twelve cases of labor from pressure of the fœtal head on the terminals of the sacral plexus (Graefe.).

3. *Theory of injury* of the coccyx, resulting in fracture, dislocation, ankylosis, or caries.

4. *Symptomatic*, i.e., a referred pain of central origin due to many functional or organic diseases of the central nervous system, as hysteria, neurasthenia, irritable spine, the traumatic neuroses, tabes dorsalis, toxæmia, or it may even be a "habit pain."

Theories one, two and three are based on trauma and comprise the major number of cases while the few remaining are symptomatic, which accords with clinical experience. In fact, a history of traumatism within the pelvis, as in difficult labor, or external violence, most commonly a fall, is so often responsible for the condition that searching inquiry must be made in every case. Rarely there is a gross lesion of the coccyx but as a rule the injury affects the periosteum alone and the soft structures adjacent or attached to the bone,—muscles, fascia, ligaments and nerves.

The nerves composing the coccygeal plexus are the fourth (mostly) and fifth sacral, the coccygeus and (probably) the inferior hæmorrhoidal branch of the internal pudic. There are also on the anterior surface of the coccyx two ganglia of the sympathetic, connected to each other by fine nerve filaments, and by other filaments to the last sacral ganglion of the chain which constitutes the pelvic sympathetic (Hamant and Pigache). Quite naturally, then, irritation of any part of a nerve plexus so intimately related to the central and the sympathetic nervous systems will elucidate the protean disturbances of sensation occurring in coccygodynia.

The coccyx is surrounded by compact structures, largely fibrous, which the delicate network of nerves traverses. Injury of these structures initiates an inflammatory reaction with proliferation and later contraction of the new fibrous tissue and compression of the nerves.

Fracture or dislocation of the coccyx may cause pressure pain. Pressure upon the nerves by the bone or contraction of the injured soft parts produces neuralgia. If the pressure is maintained, neuritis may occur, or neuritis may take place from the beginning if the trauma is of sufficient severity.

Symptoms. The chief symptom is a characteristic, spasmodic aching pain, usually localized in the region of the coccyx, aggravated by sitting or rising, and seldom affected by urination or defæcation, though constipation is usually present. While it may be a symptom of a hysterical condition, conversely, in the writer's opinion, coccygodynia long continued may result in a neurotic state.

[1]Presented before the American Proctologic Society, Atlantic City, June 7–9, 1919.

Diagnosis is made by a thorough examination, both general and local. The former embraces the spinal column to discover injury or disease and the nervous system to exclude tabes dorsalis, hysteria, the neuroses, etc. The local examination is made with the patient in the Sims' posture. The index finger is passed into the rectum and the coccyx grasped between it and the thumb outside. Thus the position, contour, mobility, and tenderness of the coccyx can be determined at once. Next the soft parts just distal and then lateral to the tip of the coccyx are compressed between the examining fingers. The patient will usually cry out with exquisite pain when the affected portion of the coccygeal plexus of nerves has been squeezed and the pathognomonic symptom elicited.

Lesions of the anal canal and rectum, simulating coccygodynia, are to be excluded. The most common of these are anal fissure, inflammation of the crypts of Morgagni (cryptitis), hypertrophied anal papillæ, blind internal fistulæ, proctitis, thrombosed hæmorrhoidal veins and foreign bodies in the rectum. In women an examination of the external and internal genitals is made and in men the prostate, seminal vesicles and urethra are examined to exclude pathology which might cause reflex pains.

Prognosis. In general the prognosis is good. I am aware that this statement is at variance with past opinion but believe that failure in most cases was due to the erroneous idea that the pain resided in the bone rather than in the nerves.

Treatment. The many methods of treatment that have yielded varying degrees of success are the best evidence of their unreliability.

Excision of the coccyx is a simple operation but should be reserved for those cases in which it is diseased or deformed or after the injection treatment has failed. The fact that in some cases the pain persists after removal of a clinically normal coccyx and is relieved in others, indicates that in those which were relieved the nerves were excised together with the bone. Even in cases of neuralgia or neuritis from pressure due to deviation of the bone, injections, which are simple and harmless, should be tried before excision.

The treatment employed by the writer is an application of the principle of injecting sensory nerves with 70 to 80 per cent alcohol, thereby causing their degeneration, as suggested by Schloesser in 1907, and practised with marked success by him and his many followers, particularly in neuralgia of the trifacial nerve.

Technique. The injections are made easily at the office under strict aseptic precautions. The patient assumes the Sims' posture and the region of the coccyx is painted with tincture of iodine. An aseptic syringe of 2 cubic centimeters' capacity is filled with 80 per cent alcohol and armed with a 2-inch needle of fine gauge. With the index finger in the rectum, the point of maximum tenderness is determined by counter-pressure with the thumb outside. Usually this is just distal to the tip of the coccyx or slightly lateral to it. Maintaining the finger in the rectum, as a guide and to guard against its puncture, the needle is inserted through the skin in the midline directly to the tender point. When this is reached, the patient may exclaim from exquisite but tolerable pain and 10 to 20 minims are injected slowly. The needle is withdrawn quickly and the iodine on the skin is neutralized with alcohol. The pain from the injected alcohol lasts a few minutes only but a dull ache may persist for 24 hours. A single injection has cured a few cases but generally, owing to the broad distribution of the coccygeal plexus of nerves, one to ten treatments, with an average of three or four, has been necessary. The interval between injections should be from five to seven days and the solution is always deposited at the point found most tender at the time of injection.

Since my report in 1914 of seven cases, I have had 21 cases, making 28 in all. Four of these, including one fractured coccyx, were not treated. Of the 24 treated cases, 20 were females with an average age of 35 years, and 4 males, average age 29 years.

External trauma was responsible for the condition in 15 cases, a fall in 13 of them; internal injury (difficult labor) in 3, two followed local operations and in four the cause could not be determined. Thus trauma was the causal factor in over 80 per cent of the series.

The duration of the pain before treatment was from 3 weeks to 15 years, averaging 22 months.

The site of tenderness was just distal or distal and lateral to the tip of the coccyx in all cases.

The coccyx felt normal in 20 cases, was directed backward in one, forward in another, ankylosed in one and had been excised without relief in one.

The number of injections varied from one to ten, average four.

Results of treatment. Clinically cured 16, relieved 7, failed 1.

Elapsed time since treatment varies from 3 months to 9 years. Relief for several years justifies the expectation of a permanent cure.

In one patient in whom there was failure to cure after 10 injections, the coccyx was resected with complete relief.

BOOK REVIEWS

A CRITIQUE OF NEW BOOKS IN SURGERY

AS a young medical man who had just finished his interneship, the reviewer called one morning many years ago on Dr. Christian Fenger to ask some fundamental questions about European medical literature. When he had learned the purpose of my visit Dr. Fenger asked me to wait for a few minutes until he was ready, saying that he would then take me back to my part of the city in his buggy. Presently we were seated in a well-worn vehicle drawn by an unduly safe and elderly horse.

After he had answered my questions he fell into consideration of the ways of those then multiplicitious surgeons (and their accursed prolificacy assures a progeny that to this day clogs the operating rooms of our solicitous hospitals) who were interested in cutting and sewing, and in observing lesions and operating without caring to investigate the inside of what they had removed. Some of these gentry had accused the bellicose Dane of being a pathologist and no proper practical surgeon. A real surgeon had no time for the laboratory; the microscope was too fallible an apparatus to be consulted in every-day work. As he deplored the attitude of the then recognized leaders of American surgery, his wrath grew with his discussion and, thinking of the atrocities he had seen perpetrated, he exclaimed at last: "I ll do surgery with any of these damned practical fellows!" And with that he grinned genially at me and we drew up before the County Hospital.

Hertzler is a man of the Fenger type—a man who finds his true satisfaction of the professional instinct in the pursuit and elucidation of the riddles of pathology as well as in the conquering of technical difficulties; in the satisfaction of a day spent in the relief of suffering and in honest study as well as of the hour spent in the lime-light before the medical multitude.

The theory and the practice of peritoneal surgery are in this work[1] closely related, as they should be. The work is one that, like a few great monographs of science, at once piques and satisfies inquiry, setting an example of quiet and loving study rather than of greed of attainment.

The first volume considers the structures and functions of the peritoneum in relation to the principles of abdominal surgery; the second volume is devoted to the immediately practical side of the subject and bears the subtitle *Diseases and Their Treatment*. The first volume is replete with the practical laboratory studies of the author controlled by a wide surgical experience; the second volume is clinical and yet is influenced in every paragraph by the writer's experimental studies of theory and principle.

In the second volume peritonitis and other peritoneal diseases are considered, at first in general terms and then with special and very definite illustrative studies. The reader may be confident that no important contribution to our knowledge has escaped inclusion in these chapters—the excellent illustrations are themselves worthy of careful study. Even the experienced surgeon finds satisfaction and interest in studying them, while the novice may easily obtain through them the fruits of life-long study summed up in a page.

The subjects of appendicitis and of the peritoneal troubles due to gall-stone disease are utilized as paradigms for the study of the behavior of the peritoneum and its inflammations. Here especially the beginner finds rich material.

The diseases and injuries of the omentum and the tumors of the peritoneum are the subjects of the final chapters.

This work is a *sine qua non* for the surgeon. It should run through many editions and be translated into languages other than English. We need many monographic works of the type of this book. The great monographs of surgery that have impressed us give us cheer for our own course in professional life. MacEwen would study head surgery and filled his wards with selected cases. Ollier cannot be forgotten for his bone work. Woelffler and Kocher were the pioneers in the cure of goiter; Courvoisier and Kehr in gall-stone disease, while Billroth in gastric surgery and in the principles of surgery gave us examples of individually-colored studies and treasured monographs of value infinitely in excess of the mere facts presented. No man is a finished surgeon but only a sort of *diener* in the operating-room who has not drawn inspiration from the monographic writings of such great men. It is not only what such men have contributed in knowledge and technique that we should seek and prize but also what they were and how they wrought should be regarded by us as priceless treasure.

Young man, learn from this work. At thirty years of age begin to study some large topic of surgery and publish a book on the subject at forty-five or fifty. But work! WELLER VAN HOOK.

[1] THE PERITONEUM. VOLUME I, STRUCTURE AND FUNCTION IN RELATION TO THE PRINCIPLES OF ABDOMINAL SURGERY; VOL. II, DISEASES AND THEIR TREATMENT. By Arthur E. Hertzler, M.D., F.A.S.C., St. Louis: C. V. Mosby Company, 1919.

EVERY physician during his professional career, some time or another, has been confronted by patients suffering from headaches often associated with eye disorder and at times neuralgic pains in neck, shoulder, and arms. Many of these headaches were attributed to various causes, chiefly toxic, yet every one has found cases in which no reason could be assigned. Due to the periodicity of the attacks many were called migraine. Many of these unfortunate patients suffered untold agony over periods of years. Many consulted the internist for diagnosis. Some finally presented themselves to the surgeon for relief, possibly operative, only to be told they were suffering from a condition the cause of which was unknown and for which there was no operative relief. If one recalls such a case in which he has apparently exhausted every means at hand to arrive at a diagnosis and has failed to relieve his patient, he will no doubt read with intense interest the monograph by Sluder.[1] The little volume intended for the rhinologist and laryngologist, can be read with profit by the surgeon, internist and practitioner. The author after a general introduction on pathological anatomy by Dr. Jonathan Wright, discusses headache in general, headache of nasal origin, and migraine. Much is said regarding vacuum frontal headache with eye symptoms. He also includes ethmoid and maxillary sinus conditions. The anatomy and pathology is taken up in detail with a logical method of examination and treatment. The Meckel's ganglion neurosis is taken up in a chapter, and much interesting data is presented. In a final chapter devoted to hyperplastic sphenoiditis, the author presents in a clean although minute manner that peculiar pathology of the sphenoid which will in many instances escape the attention of the less skilled rhinologist. It is this obscure and rarely detected pathology which in many instances causes recurring attacks of severe headache often accompanied by eye disorders. There is no doubt but that this volume is a distinct addition to the permanent literature of laryngology and rhinology, and that it will be the direct means of affording relief to many individuals suffering from this type of disease. J. A. WOLFER.

THE muscles which constitute the greater part of the bulk of the human body have to the present received but little attention, either for study as to their inherent action or their more complex action and use. It is a known and accepted fact that muscles are unnecessarily traumatized and sacrificed during operative procedures, without a single thought as to the possible deleterious after effects. Many surgeons have a cultivated instinct which assures them that if a muscle is destroyed or mutilated, nature will in some mysterious manner restore it to the normal or other muscles will in some way bring about compensation. This latter error has caused many cripples and deformed individuals and will continue to until some respect is instilled into the surgeon for muscle tissue integrity.

Mackenzie[2] in his little volume on *The Action of Muscles* has taken the first decisive step in this direction. In the introduction the author states: "In army medical circles the view is held that of the wounded men returning from the French battlefields in the Great War, some 65 per cent are suffering from disabilities of an orthopedic nature; in other words whether the injury be one of muscle, bone, joint, nerve, or central nervous system, it is of a character in which the question of muscular function becomes of prime importance for purposes of treatment. When we consider that muscular tissue alone constitutes the largest part of most animals, it is surely time that more attention is paid to the teaching of myology than has been allowed heretofore.

"Functions of muscles—the all-important factor—cannot be satisfactorily taught in the dissecting room. It can only be taught on the living and is largely a question of comparison, a comparison between the normal and the paralytic. Only on this plan can the question of origin and insertion of a muscle have more than an academic or rather examination interest for the student."

The author discusses muscle action in such a manner that the reader is impressed with the fact that every muscle has a definite function to perform and that unless this function is duly performed, it distinctly interferes with other function. Muscle rest as applied to the treatment of disabled or paralyzed muscles is discussed. Only by minute study of individual muscle action can muscle rest be ascertained and applied in treatment. The author's comparative study of animal life in conjunction with mechanical principle of lever and pulleys builds a new structure for study of muscle. In successive chapters, the various anatomic regions are discussed with a view of a comprehensive study of the muscles, their anatomic relations, actions, and positions of rest. He also takes pains to impress the reader that a muscle which has been paralyzed cannot be expected to perform 100 units of work at the first effort when function is returning. This is the basis of a rather minute and interesting discussion on re-education for muscular weakness.

After reading this little volume carefully, it becomes very apparent why there are so many failures following nerve suture and extensive muscle and bone injuries. There is no question but that every surgeon after reading this book will see the new light with the result that his patients will receive more careful study, more intelligent treatment, and the end-results will be infinitely better.

J. A. WOLFER.

THE Great War by its gigantic destructive agents and its resultant stimulus to prevent destruction, especially in the human individual, has been

[1] CONCERNING SOME HEADACHES AND EYE DISORDERS OF NASAL ORIGIN. By Greenfield Sluder, M.D. St. Louis: C. V. Mosby Company, 1919.

[2] THE ACTION OF MUSCLES INCLUDING MUSCLE REST AND MUSCLE RE-EDUCATION. By William Colin Mackenzie, M.D., F.R.C.S., F.R.S. (Edin.) New York: Paul B. Hoeber, 1918.

the direct means for expansion of the field of orthopedic surgery. The massive statistics have to date not become available, nevertheless, one is confronted by the never failing sign, the maimed and crippled. How could it have been prevented and how can they be returned to society, as an asset and not a liability? Comparatively few definite steps in advance have been taken in recent years in orthopedic surgery until the Great War was in full swing; then it became suddenly apparent that something must be done. The recent revision of Whitman's edition[1] is a forerunner of what we may expect in the near future. In the past, the volume was the essence of our knowledge of orthopedic surgery. The new edition retains the priceless information to which has been added the more recent work done in paralysis such, as due to poliomyelitis, and includes a chapter on military orthopedic surgery. This later subject is more or less in brief form and needs expansion and detail. This can be given only after results have been ascertained. This volume is exceedingly well illustrated and the text is interestingly phrased.

J. A. WOLFER.

[1] A TREATISE ON ORTHOPEDIC SURGERY. By Royal Whitman, M.D., M.R.C.S. (Eng.), F.A.C.S. 6th ed. thoroughly revised. Philadelphia and New York: Lea & Febiger, 1919.

CORRESPONDENCE

CHOICE OF OPERATION IN CHRONIC GASTRIC AND DUODENAL ULCER

To the Editor: In the article which appeared in the September number of this magazine from the pen of Mr. Walton, the statement is made that double gastrojejunostomy is advocated by me for the treatment of this condition. I have never recommended this operation as the routine treatment of cases of hour-glass stomach.

In the article of mine from which he quotes it was advised as the treatment of those cases in which pyloric stenosis was present in addition to the constriction in the body of the stomach—a rare complication (4 out of 69 cases).

In a "Contribution to the Discussion on the Choice of Operation in Chronic Gastric and Duodenal Ulcer" published in this magazine in November, 1914, I wrote: "When hour-glass stomach has supervened, gastrojejunostomy on the central side of the obstruction—single if there is one obstruction only, double if two—is the most satisfactory operation. *The indications for excision or partial gastrectomy are the same as in ulcer without this complication.*"

In most of the cases of hour-glass stomach the ulcer producing the obstruction is adherent to surrounding structures, particularly the pancreas and needs direct treatment. The following table of the operations carried out in the 69 cases of simple hour-glass stomach which have been under my care illustrates this.

	Cases	Death
Partial gastrectomy	39	4
Single gastrojejunostomy with excision of ulcer in 5 cases.	26	1
Double gastrojejunostomy.	4	

So far from regarding double gastrojejunostomy as the operation of choice, I carry it out only in the exceptional cases mentioned.

JAMES SHERREN, C.B.E., F.R.C.S.

London, England.

RELATION OF METHOD OF ADMINISTERING PARATYPHOID VACCINE AND ONSET OF ACUTE APPENDICITIS

To the Editor: In my article entitled, "Immediate Surgical Management of Acute Appendicitis in Military Hospitals," published in SURGERY, GYNECOLOGY AND OBSTETRICS in March, 1919, I inadvertently did not mention the name of Dr. M. L. Morris, of the laboratory service, Camp Pike Base Hospital, as being one of the first medical officers to suggest the possibility of a relationship between the effect caused by the method of administering paratyphoid vaccine and the onset of appendicitis. The name of Dr. Morris is mentioned in connection with a report on the pathology of the appendix of one patient. I am glad, therefore, to take the opportunity to give him credit for his suggestions.

HUGH MCKENNA, M.D.

Clinical Congress
American College of Surgeons

NINTH ANNUAL MEETING
NEW YORK CITY
OCTOBER 20 TO 24, 1919

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CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

WILLIAM J. MAYO, M.D., President. ALBERT J. OCHSNER, M.D., Treasurer.
FRANKLIN H. MARTIN, M.D., Secretary-General.

THE CLINICAL CONGRESS IN NEW YORK CITY

THE ninth annual meeting of the Clinical Congress of American College of Surgeons in New York City comes at an opportune time. The return to their homes of the scores of medical men who have been in military service, together with the marked expansion in hospital facilities during the war and subsequent to the armistice, have brought us new enthusiasm for this second visit of the Clinical Congress to New York.

The marked development in the surgical and chemical sterilization of wounds incident to war surgery, the larger and more amplified technique of bone surgery, the new impetus given chest surgery and the collective experience of the various surgeons engaged in war work will all have an expression in the forthcoming Congress.

In addition, there is the desire of the New York surgeons to have with them again the Fellows of the College of Surgeons and to take up the problems of civil surgery. Special arrangements are being made in all the metropolitan hospitals in greater New York, as well as in private institutions, to care for the unusually large attendance which the profession of New York expects. Of particular value will be the careful segregation of clinics, so that it will be possible for the visiting surgeons to select any or all of the varied surgical fields on different days and visit the various clinical groups in the city.

It may be said that the collective clinical material of greater New York is not equalled by any other city in the world and the remarkable progress made in the last few years in hospitalization, in adequate and extensive dispensary service, has brought about a more scientific arrangement for the treatment of surgical cases. In no small measure the impetus to this improved and advanced hospital work is due to the standardization first initiated and subsequently carried out by the College of Surgeons, and the meeting of the Clinical Congress in New York this year will demonstrate and show further possibilities for hospital progress in the various branches of surgery and allied specialties.

The amplified traction systems of the city have brought the outlying hospitals into closer touch with the center of the city, and it is now possible to visit any of the hospitals in greater New York, starting from headquarters at the Waldorf-Astoria, within thirty to forty-five minutes. Fortunately for the concentration and observation of clinical material, the major groups of hospitals are located within ten to fifteen minutes of the Waldorf-Astoria via the surface, elevated, or subway systems. In fact, the principal hospitals of the city are located within a relatively small area, with headquarters of the Clinical Congress as the center.

The recent addition to the hotel facilities of New York of a half dozen large hotels means that the visitors will have less difficulty in reserving adequate accommodations.

The profession of New York, united under able leadership and by means of adequate committees of able men, has been able to arrange and systematize the surgical work of the city during the week of the Congress, so as to cover every department of surgical endeavor, emphasizing diagnosis, operative technique and the after-care of the patient.

The New York Committee is united in the keen desire to place before the visiting surgeons their maximum surgical effort.

HOSPITAL STANDARDIZATION

The constructive work of the College centers in its program of hospital standardization. Each fellow of the College is a part of that program. Its success depends largely upon the extent to which the fellows, first, enter into the work themselves and, second, enlist the co-operation of hospital trustees, physicians and surgeons, superintendents, laboratory workers, nurses, and the interested public, in the betterment of hospitals. On Friday, October 24, during the morning and afternoon, a complete review will be made of the work of the College in hospitals. This review will include a statement of what the College has done, illustrated by lantern slides. The "minimum standard" will be explained and the list of hospitals which met this standard will be presented. The problems which arose in connection with the work will also be discussed and, finally, the practical application of the program of the College, as it is now being worked out in a group of hospitals, will be presented.

The afternoon session will be devoted chiefly to a general discussion of the subject matter considered at the forenoon session. Attention will also be given during the afternoon to the program of the College for the ensuing year.

These meetings will be held in the ballroom of the Waldorf-Astoria. The following program is self-explanatory:

MORNING SESSION, 9 O'CLOCK

Introductory: The Right to Health, WILLIAM J. MAYO, M.D., President of the College.

Standardization in Catholic Hospitals, CHARLES B. MOULINIER, S.J., President Catholic Hospital Association.

The Work of the College in Hospitals, JOHN G. BOWMAN, Director of the College.

Practical Application of Hospital Standardization:

1. At the Vancouver General Hospital, T. M. MCEACHERN, M.D., Superintendent.

2. At the Woman's Hospital, New York, GEORGE GRAY WARD, JR., M.D., Chief Surgeon.

3. At St. Vincent's Hospital, Los Angeles, EDWARD THOMAS DILLON, M.D., Surgeon-in-Charge.

4. At Mt. Sinai Hospital, Cleveland, FRANK E. CHAPMAN, Superintendent.

Discussion.

AFTERNOON SESSION, 2.30 O'CLOCK

General discussion of hospital standardization as presented during the morning session. Consideration of the program of the College for the ensuing year.

GENERAL PLANS FOR THE NEW YORK MEETING

Following the general plan of previous sessions, the morning and afternoon hours of each of the five days will be devoted to operative clinics and demonstrations. A list of the clinicians and institutions that are co-operating to provide the clinical entertainment is published in the following pages. The real program of the Congress, however, is that bulletined each afternoon at headquarters, which gives in complete detail the cases to be operated upon and demonstrated in the several clinics on the succeeding day. Printed programs containing the schedule of clinics and demonstrations, together with announcements as to evening and other general sessions, are published each morning.

The preliminary program of the evening sessions to be held in the ballroom of the Waldorf-Astoria will also be found in the following pages.

The Committee on Arrangements is preparing a schedule of clinics and demonstrations which will fully represent the clinical activities of greater New York. All departments of surgery are to be represented, including gynecology, obstetrics, urology, orthopedics, surgery of the eye, ear, nose, throat and mouth, roentgenology, experimental surgery, surgical pathology, etc.

The Committee is also arranging for a series of clinical demonstrations before large groups, to be held each afternoon in some conveniently located hall or amphitheater. At these demonstrations surgical problems of present-day interest will be discussed with the aid of exhibition of cases, specimens, lantern slides, charts, etc. A number of the visiting surgeons have been asked to participate in these demonstrations.

LIMITED ATTENDANCE—ADVANCE REGISTRATION

The popularity of these clinical meetings has proven so great that it has been found necessary in recent years to adopt the plan of limiting the attendance and requiring advance registration. A survey of the operating amphitheaters, lecture rooms and laboratories in the hospitals and medical schools as to their capacity for accommodating visiting surgeons has been made and the limit of attendance based thereon. Visiting surgeons are thus assured that there will be accommodations at the clinics for all who receive

cards. When the limit of attendance has been reached through advance registration, no further registrations will be accepted.

To each surgeon registering in advance a formal receipt for the registration fee is issued, which receipt is exchangeable for a general admission card at headquarters upon his arrival. This card, which is non-transferable, must be presented to secure clinic tickets and admission to the evening meetings. Headquarters at the Waldorf-Astoria will be open for registration on Sunday, October 19th, for the convenience of members arriving in the city on that day. The clinical program for Monday will be bulletined at headquarters on Sunday and tickets for Monday's clinics will be issued as visiting surgeons register.

HEADQUARTERS

General headquarters for the Congress will be at the Waldorf-Astoria Hotel, where the Grand Ballroom, Astor Gallery, Myrtle and East Rooms, together with other large public rooms and foyers, have been reserved for the use of the Congress for its registration and ticket bureau, bulletin rooms, etc. The Grand Ballroom will be used for the general sessions, afternoon and evening. The Hotel McAlpin, with its large number of guest rooms, under the same management as the Waldorf-Astoria and located in the same block, will be able to take care of a very large number of the visiting surgeons. There are many other first-class hotels in the immediate vicinity, but because New York hotels are usually well filled in October, it is urged that surgeons who expect to attend the Congress, make early reservation of hotel accommodations.

CLINIC TICKETS

Attendance at all clinics and demonstrations is controlled by means of special clinic tickets, the number of tickets issued for any clinic or demonstration being limited to the capacity of the room in which the clinic or demonstration is to be given. As a general rule one may have two tickets for each day, one for a morning and one for an afternoon clinic, but for certain clinics, where the accommodations are limited and the demand for tickets is heavy, the rule will be that a visitor may have but one ticket for such clinic during the week. The use of clinic tickets has proven an efficient means of providing for the distribution of visitors among the several clinics and insures against overcrowding.

Clinic tickets will be issued at headquarters each morning at 8 o'clock for the clinics and demonstrations to be given that day, a complete schedule of the day's clinics having been posted on the bulletin boards on the afternoon of the preceding day. After the program has been posted, reservations for clinic tickets for the next day's clinics may be filed, the tickets to be issued the next morning. Printed programs will be issued each morning, containing the complete clinical program, with announcements of the evening session, business meetings, etc.

REGISTRATION FEE

A registration fee is required of each surgeon attending the annual clinical meeting, the receipts from registration fees providing the funds with which to meet the expenses of preparing for and conducting such meetings, so that no financial burden is imposed upon the members of the profession in the city entertaining the Congress.

COMMITTEES ON CLINICS

General Chairman—Charles Gordon Heyd.
General Surgery—Charles H. Peck, Chairman.
Orthopedic Surgery—Charlton Wallace, Chairman.
Gynecology—Howard C. Taylor, Chairman; George Gray Ward, Jr., Secretary.
Obstetrics—William E. Studdiford, Chairman; W. E. Caldwell, Secretary.
Urology—Joseph F. McCarthy, Chairman; C. G. Bandler, Secretary.
Ophthalmology—Martin Cohen, Chairman; H. H. Tyson, Secretary.
Laryngology—Cornelius G. Coakley, Chairman; Lee M. Hurd, Secretary.
Otology—Arthur B. Duel, Chairman; John Rudolph Page, Secretary.
Surgical Research—Eugene Pool, Chairman.
Laboratory Demonstrations—Frederic E. Sondern, Chairman.
X-Ray Demonstrations—Harry Miles Imboden, Chairman.
Brooklyn Clinics—O. P. Humpstone, Chairman.
Publicity—George W. Kosmak, Chairman.
Finance—J. F. Erdmann, Chairman.

PRELIMINARY CLINICAL SCHEDULE

New York Hospitals and Clinicians

GENERAL SURGERY

Bellevue Hospital—Nathan W. Green, Eugene Draper, John C. Vaughan, F. W. Gravelle, Donald Gordon, G. A. Carlucci, Frederic Montgomery, John Rogers, George D. Stewart, W. H. Barber, F. A. Smith, Vincent Guadiana.

Broad Street Hospital—Robert T. Morris, T. F. Sullivan, A. Judd John Healy.

City Hospital—Nathan W. Green, Joseph Robertson, Dr. Armstrong.

Correctional Hospital—W. Travis Gibb, Frank C. Yeomans, W. H. Stratford.

Flower Hospital—Louis R. Kaufman, Anson H. Bingham, E. W. Kellogg, O. R. von Bonnewitz, George W. Lutton.

French Hospital—J. P. Hoguet, M. I. Blank.

Gouverneur Hospital—E. L. Kellogg, Albert Sellenings.

Hahnemann Hospital—G. W. Roberts, W. G. Crump, H. A. Foster, Sprague Carleton, J. H. Forbes, H. B. Safford.

Harlem Hospital—H. A. Haubold.

Lenox Hill Hospital—Willy Meyer, F. Kammerer, F. Torek.

Memorial Hospital—H. H. Janeway, William B. Coley, Benjamin S. Barringer, George H. Mallett, Harold C. Bailey.

Metropolitan Hospital—William F. Honan, G. S. Harrington, C. L. Bagg, Joseph H. Fobes, Ralph S. Ward, M. W. McDuffy.

Mt. Sinai Hospital—A. A. Berg, Richard Lewisohn, John C. A. Gerster, Abraham J. Beller, Solomon Wiener, Martin W. Ware, William Thalhimer, Charles A. Elsberg, Alfred S. Taylor, Abraham O. Wilensky.

Neurological Institute—C. A. Elsberg, A. S. Taylor.

New York Hospital—C. L. Gibson, J. M. Hitzrot, C. E. Farr, S. Erdman, J. A. Vietor, E. M. Hawkes.

Polyclinic Hospital—John A. Wyeth, William Sharpe, Jerome M. Lynch.

Post-Graduate Hospital—J. F. Erdmann, S. Lloyd, E. W. Peterson, C. G. Heyd, J. J. Moorhead.

Presbyterian Hospital—A. V. S. Lambert, E. T. Rulison, Hugh Auchincloss, A. O. Whipple, J. M. Hanford, Forbes Hawkes, James A. Corscaden.

Roosevelt Hospital—Charles H. Peck, Seth Milliken, Charles N. Dowd, L. W. Hotchkiss.

Hospital for Ruptured and Crippled—William B. Coley, J. P. Hoguet.

Skin and Cancer Hospital—Staff.

St. Francis Hospital—John Rogers, Walter C. Cramp, Francis Edgerton, Anthony H. Harrigan.

St. Luke's Hospital—William A. Downes, W. Martin, Nathan W. Green, Frank S. Mathews, John Douglas, Winfield S. Schley.

St. Mary's Hospital—Frank S. Mathews, Edward Truesdell, Charles E. Farr.

St. Vincent's Hospital—George D. Stewart.

GYNECOLOGY

Bellevue Hospital—William E. Studdiford.

Beth Israel Hospital—S. W. Bandler, M. Robinson.

City Hospital—H. S. Stearns.

Fordham Hospital—William P. Healy

Hahnemann Hospital—Walter G. Crump.

Harlem Hospital—I. S. Haynes, A. Stein.

Italian Hospital—M. Caturani.

Lebanon Hospital—G. Seeligmann.

Lenox Hill Hospital—Frank R. Oastler, G. Seeligmann, A. Stein.

Lincoln Hospital—Frank R. Oastler, Edward T. Hull.

Mt. Sinai Hospital—H. N. Vineberg, Joseph Brettauer.

Park Hospital—I. S. Haynes.

Polyclinic Hospital—C. G. Child, L. J. Ladinsky, T. H. Morgan, J. C. Taylor.

Post-Graduate Hospital—S. W. Bandler, J. N. West, H. D. Furniss, Howard C. Taylor, William P. Healy.

Sloane Hospital—Staff.

Woman's Hospital—LeRoy Broun, Dougal Bissell, G. G. Ward, Jr., Herman Grad.

OBSTETRICS

Lying-In Hospital—Asa B. Davis, C. F. Jellinghaus, Ross McPherson, W. A. Morgan, H. M. Ratliff.

Manhattan Maternity Hospital—J. C. Edgar, Austin Flint, David Barrows, H. C. Bailey, Wm. M. Ford, Frederick C. Rice, H. C. Williamson.

ORTHOPEDIC SURGERY

Bellevue Hospital—Staff.

Hospital for Ruptured and Crippled—Staff.

Hospital for Deformities and Joint Diseases—Staff.

New York Orthopedic Hospital—Staff.

Post-Graduate Hospital—Staff.

St. Luke's Hospital—Staff.

UROLOGY

Bellevue Hospital—E. L. Keyes, Jr., Alfred Osgood, Raymond Stevens, B. S. Barringer, O. S. Lowsley.

Flower Hospital—Sprague Carleton, Rene Kaufman.

Good Samaritan Hospital and Dispensary—G. W. Swinburne.

Lenox Hill Hospital—Joseph J. Asch.

Memorial Hospital—B. S. Barringer.

Metropolitan Hospital—Sprague Carleton.

Mt. Sinai Hospital—Edwin Beer, Leo Buerger, A. Hyman, Martin W. Ware.

New York Hospital—O. S. Lowsley, M. S. Rohde, Charles J. Goeller.

Post-Graduate Hospital—J. Bentley Squier, Joseph F. McCarthy, Clarence G. Bandler, James Pedersen, Stanley R. Woodruff, George F. Cahill.

Presbyterian Hospital—J. Bentley Squier, Joseph F. McCarthy, Clarence G. Bandler.

St. Mark's Hospital—Victor C. Pedersen, F. Ackerman.

West Side Dispensary—Frederic Bierhoff.

Woman's Hospital—H. G. Bugbee, F. E. Dubois.

OPHTHALMOLOGY

Bellevue Hospital—Charles H. May, Julius Wolff.

Harlem Eye and Ear Hospital—Charles B. Meding.

Knapp Memorial Hospital—Arnold Knapp, Ervin Torok, Henry H. Tyson.

Manhattan Eye, Ear and Throat Hospital—James W. Cassell, John R. Shannon, E. Thomson, Frank Van Fleet, Dr. Kenny, Alfred D. Mittendorf, George R. Hare, Herbert W. Wootton.

MT. SINAI HOSPITAL—Carl Koller.
NEW YORK EYE AND EAR INFIRMARY—George S. Dixon, R. G. Reese, George H. Bell, Walter E. Lambert, John E. Weeks, John M. Wheeler, L. W. Callan.
NEW YORK OPHTHALMIC HOSPITAL—George A. Shepard, Dr. Healy, Dr. McLane, Charles H. Helfrich, Dr. Lloyd, De Wayne Hallett.
POST-GRADUATE HOSPITAL—Ellice M. Alger, M. Cohen, A. Edward Davis, Dr. Troncoso, Dr. Meeker.
ROCKEFELLER INSTITUTE—Dr. Noguchi.
ST. LUKE'S HOSPITAL—Colman W. Cutler, Alfred Wiener.

LARYNGOLOGY

BELLEVUE HOSPITAL—E. L. Pratt, L. M. Hurd, C. G. Coakley, J. D. Kernan, Jr.
GOUVERNEUR HOSPITAL—W. W. Carter.
MANHATTAN EYE, EAR AND THROAT HOSPITAL—L. A. Coffin, John E. MacKenty, J. D. Kernan, Jr., O. L. Monroe, W. W. Griffin, J. A. Mulholland, William M. Dunning, E. V. Hubbard, Harmon Smith, I. W. Voorhees, E. R. Faulker.
NEW YORK EYE AND EAR INFIRMARY—J. J. King, John M. Hall, N. R. Dann, John McCoy, T. L. Saunders, L. D. Alexander.
NEW YORK THROAT AND NOSE HOSPITAL—L. M. Hurd.
POLYCLINIC HOSPITAL—J. H. Abraham, H. L. Lynah, H. L. Gatewood, M. D. Lederman, D. S. Dougherty, A. M. Anderson.
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ST. LUKE'S HOSPITAL—A. P. Voislawsky, L. T. Perrault, W. M. Hunt, D. B. Delevan.
VANDERBILT CLINIC—John Leshure, E. L. Pratt.
UNIVERSITY AND BELLEVUE MEDICAL COLLEGE—Arthur J. Huey, John McCoy.
WILLARD PARKER HOSPITAL—H. L. Lynah.

OTOLOGY

BELLEVUE HOSPITAL—W. C. Bowers, T. L. Saunders, Lee M. Hurd.
MANHATTAN EYE, EAR AND THROAT HOSPITAL—Philip D. Kerrison, John D. Richards, James G. Dwyer, Dr. Pike, Wendell C. Phillips, J. Clarence Sharp, Frederick M. Law, Isidore Friesner, Dr. Straus, Alfred Braun, Warren C. McFarland, John R. Page.
NEW YORK EYE AND EAR INFIRMARY—Edward B. Dench, Charles E. Perkins, John A. Robinson, Dr. Scutter, George S. Dixon, Gorham Bacon, Edward B. Sutphen, John M. Hall, Frederick Whiting, Robert Lewis, Hugh B. Blackwell, William Ferguson, James J. King, John McCoy, Truman L. Saunders, A. U. Callisen.
POLYCLINIC HOSPITAL—James M. Smith, Dr. Stevens, George E. Davis.
POST-GRADUATE HOSPITAL—Perry Schoonmaker, Warren C. McFarland, Edgar H. Farr, J. H. O'Connell, Clarence H. Smith, H. Beattie Brown.
ST. LUKE'S HOSPITAL—Edward B. Dench, Wesley C. Bowers, Charles E. Perkins.

BROOKLYN HOSPITALS AND CLINICIANS

GENERAL SURGERY

BROOKLYN HOSPITAL—H. F. McChesney, N. P. Rathbun, R. W. Westbrook, Walter Truslow.
HOLY FAMILY HOSPITAL—J. M. Downey, W. V. Pascual.
JEWISH HOSPITAL—J. Linder, William Linder, G. I. Miller, J. B. Bogart.
KINGS COUNTY HOSPITAL—J. B. Bogart.
LONG ISLAND COLLEGE HOSPITAL—W. F. Campbell, J. S. Wight, H. C. Fett, H. H. Morton.
METHODIST EPISCOPAL HOSPITAL—R. S. Fowler, H. F. Graham, C. H. Goodrich, A. H. Bogart.

GYNECOLOGY

BETHANY DEACONESS HOSPITAL—H. A. Wade.
CONEY ISLAND HOSPITAL—V. A. Robertson.
BROOKLYN HOSPITAL—R. H. Pomeroy.
BUSHWICK HOSPITAL—W. A. Jewett.
GREENPOINT HOSPITAL—F. C. Holden.
WYCKOFF HEIGHTS HOSPITAL—F. Weisbrod.
HOLY FAMILY HOSPITAL—V. L. Zimmerman.
JEWISH HOSPITAL—A. M. Judd, A. Bonner, J. O. Polak, L. Schwartz.
LONG ISLAND COLLEGE HOSPITAL—C. S. Hyde, W. P. Pool, J. O. Polak.
METHODIST EPISCOPAL HOSPITAL—O. P. Humpstone, R. M. Beach.
ST. CATHERINE'S HOSPITAL—C. A. Gordon.
ST. MARY'S HOSPITAL—V. L. Zimmerman.
SKENE SANITARIUM—L. G. Baldwin.
WILLIAMSBURG HOSPITAL—J. P. Glynn, H. A. Wade.

EYE, EAR, NOSE AND THROAT

BROOKLYN HOSPITAL—C. G. Crane, W. S. Shattuck.
JEWISH HOSPITAL—A. M. Howe, A. Hayman.
LONG ISLAND COLLEGE HOSPITAL—A. J. Keenan, H. M. Smith.
METHODIST EPISCOPAL HOSPITAL—P. H. Sturgis.

PRELIMINARY PROGRAM OF EVENING SESSIONS

IN THE BALL ROOM OF THE WALDORF-ASTORIA, AT 8 P. M.

Presidential Meeting, Monday, October 20

Address of Welcome: J. BENTLEY SQUIER, M.D., New York, Chairman of Committee on Arrangements.
Address of retiring president: JOHN G. CLARK, M.D., Philadelphia.
Inaugural address: WILLIAM J. MAYO, M.D., Rochester, Minn.
Introduction of foreign guests: SIR ROBERT JONES, Liverpool; MAJOR GILLIES, R.A.M.C., Sidcup; SIR ANTHONY BOWLBY, London.
SIR ANTHONY BOWLBY, K.C.B., K.C.M.G., K.C.V.O., F.R.C.S., London: Fractures of the Femur.
Discussion: F. N. G. STARR, M.D., Toronto.

Tuesday, October 21

HARVEY CUSHING, M.D., Boston: Brain Tumor Statistics.
Discussion: CHARLES H. FRAZIER, M.D., Philadelphia; ALLEN B. KANAVEL, M.D., Chicago; CHARLES A. ELSBERG, M.D., New York.
ALEXIS V. MOSCHCOWITZ, M.D., New York: Empyema; with Particular Reference to Its Pathogenesis and Treatment.
Discussion: JOHN L. YATES, M.D., Milwaukee; JAMES F. MITCHELL, M.D., Washington.

Wednesday, October 22

SIR ROBERT JONES, F.R.C.S., Liverpool, England: Stiff and Flail Joints.
Discussion: JOSEPH A. BLAKE, M.D., New York; JOHN L. PORTER, M.D., Chicago; JOEL E. GOLDTHWAIT, M.D., Boston.
GEORGE W. CRILE, M.D., Cleveland: Surgical Treatment of Exophthalmic Goiter.
Discussion: J. CHALMERS DACOSTA, M.D., Philadelphia; DEAN LEWIS, M.D., Chicago; CHARLES H. MAYO, M.D., Rochester, Minn.
OTTO P. GEIER, M.D., Cincinnati: The Physician and Surgeon in the Industrial Era.
Discussion: JOHN J. MOORHEAD, M.D., New York; WILLIAM O'NEILL SHERMAN, M.D., Pittsburgh; JONATHAN M. WAINWRIGHT, M.D., Scranton; R. M. LITTLE, Safety Institute of America, New York; GEORGE EASTMAN, Eastman Kodak Company, Rochester, N. Y.

Thursday, October 23

JOHN B. DEAVER, M.D., Philadelphia: The Acute Abdomen.
Discussion: J. M. T. FINNEY, M.D., Baltimore; GEORGE E. BREWER, M.D., New York; GEORGE E. ARMSTRONG, M.D., Montreal.
MAJOR GILLIES, R.A.M.C., Sidcup, England: Plastic Operations for Facial Burns.
C. JEFF MILLER, M.D., New Orleans: Radio-Therapeutic and Other Methods for Treatment of Cancer of the Uterus.
Discussion: JAMES F. PERCY, M.D., Galesburg, Ill.: Cautery; HENRY K. PANCOAST, M.D., Philadelphia: X-Ray; HAROLD C. BAILEY, M.D., New York: Radium.

Friday, October 24

Convocation of the American College of Surgeons:
Conferring of Honorary Fellowships.
Presentation of Candidates for Fellowship.
Presidential Address: WILLIAM J. MAYO, M.D., Rochester, Minn.
Fellowship Address: Sir ANTHONY BOWLBY, K.C.B., K.C.M.G., K.C.V.O., F.R.C.S., London.